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City of Oak Ridge Master Plan to address the "transition from a sprawling war-built town with many temporary buildings to a permanent city containing the facilities that people need for normal peacetime living." Gives a brief history of the town, a description of the region, land use, housing description, composition of population, ^{and} existing and future facilities. Includes several large fold-out maps of land use in the City of Oak Ridge.

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MASTER PLAN
OAK RIDGE, TENNESSEE

Report to the Atomic Energy Commission on the

MASTER PLAN

OAK RIDGE TENNESSEE

SKIDMORE OWINGS & MERRILL

Architects • Engineers

December, 1948

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FOREWORD

WHY A MASTER PLAN FOR OAK RIDGE?

Oak Ridge is a city with a purpose. It was built during the war to house the operating and scientific personnel of the huge atomic energy plants constructed in the hills of East Tennessee. It still is needed for that purpose.

It is now in process of transition from a sprawling war-built town with many temporary buildings to a permanent city containing the facilities that people need for normal peacetime living. Its population has dropped from a wartime high of 75,000 to a current total of 36,000. The figure is expected to stabilize around 50,000 when adequate facilities are available for the permanent plant operators and their families, and for the businessmen, doctors, teachers, bus drivers, and others who serve the day-to-day needs of the community.

The process of transition will take time. Temporary shelter must be replaced with permanent homes. More business buildings must be built. Additional schools, churches, and theaters are needed. Here and there roads or utility lines, hurriedly built to meet a war emergency, must be relocated and new streets and utilities built to serve new developments.

The planning and building of these facilities will be spread over many years, and many people will take part in it. Some of it will be done by the Atomic Energy Commission to provide the essentials needed to keep its program going. Some will be done—now is being done—by business-men building the types of structure needed for their enterprises. Some will be done by church congregations erecting fitting buildings for their worship, and by individuals securing homes for their families. Some will be done by the municipality of Oak Ridge when, as anticipated, it secures a corporate charter from the State of Tennessee and becomes a normally operating city.

If everyone concerned with this process went his own way in his own time, the result would be a hodge-podge of buildings, streets and utilities either getting in each other's way or lacking where most needed. The result would not be a smooth-running, economical city and certainly not a pleasant one to live in. It would fail to serve the basic purpose for which Oak Ridge exists, to provide good living for people who are depended upon to do good work.

Oak Ridge has a good start. It contains thousands of well-designed and well-built dwellings, modern schools and shops. It has many miles of well-paved streets skillfully fitted to its rugged terrain. It has modern water, sewerage, and power systems. Despite the terrific speed with which it originally was planned and built, and despite the shortages of materials and labor that continually plagued its progress, its basic development is good.

The job ahead is to preserve the good that is already built, modify it where necessary to fit long range requirements, provide the new facilities that will be needed to replace temporary ones, and put the city on a permanent peacetime footing. That calls for careful planning, for setting clear and useful guide lines by which the many different individuals who do the actual building of the city can set their course.

It is the purpose of the Oak Ridge Master Plan to set these guide lines so that the many separate developments undertaken by different people at different times and under different circumstances will all add up to a well-organized and adequate city structure. The Master Plan is primarily a plan for the use of land within the city area. Its purpose is to make sure that the right amounts of land of the right kinds and in the right places are reserved for homes, apartments, shopping centers, schools, playgrounds, churches, streets, industries, and the thousand-and-one other things that make up the structure of a modern city.

Its purpose also is to see that these things are located in proper relationship to one another, that schools are located in proper relationship to the homes from which they draw their children, that streets and parking areas are located in proper relationship to expected traffic loads, that industrial areas have the railroad and trucking facilities they need, and so on.

That is the part of the Master Plan, having to do with the physical development and the general arrangement of the future city. There is another part—the administrative machinery—by which the people of Oak Ridge can assure themselves that the development of their city actually proceeds within the guide lines that the plan provides, or that those guide lines

are wisely modified when modification is needed. These administrative methods and procedures are covered in a later section of this report.

The preceding sections of the report describe the conditions on which the Plan is based, the size and kind of city for which it is designed, and the various components that fit together to form the total.

BASIS FOR PLANNING

A BRIEF HISTORY

Oak Ridge is no ordinary city. Its history is as dramatic as it is brief. Seven years ago its site was a sparsely-settled rural valley flanked by wooded hills. The city was not reported in the 1940 census, and prewar maps gave no sign of it except for the designation "Black Oak Ridge" upon the hills that form its northern border.

In the opening months of the war men sought a place where highly secret and potentially dangerous installations could be built, away from populous centers yet close to large supplies of electric power and other services. The place was found in the ridge and valley country of East Tennessee, twenty miles west of Knoxville. Power lines of the Tennessee Valley Authority crossed the site. Main highways and railroad lines were near. Hills and rivers afforded natural protection.

Here in the summer of 1942 there was established what at first prophetically was called a "demolition area," later renamed the Clinton Engineer Works. Fifty-nine thousand acres were acquired for the construction of the atomic energy plants of the newly-created Manhattan District, special branch of the Corps of Engineers, U. S. Army.

The project was fabulous on every count. Enormous plants with highly-complex equipment had to be built at great speed and in the greatest secrecy. Railroad lines had to be extended and yard facilities developed. Power supplies had to be increased. New roads were needed and old ones had to be improved. On top of that, housing had to be provided for the thousands of operators who would run the completed plants and for the top-flight scientific personnel still wrestling with the problems of designing and producing the atom bomb. Much of the construction labor also had to be housed near the job.

There was no available housing in the surrounding area. Nearby towns were few and small and already busy with war production. Knoxville was already short of housing for workers in its numerous war industries. The great plants of the Aluminum Company to the south and the urgent construction programs at TVA power installations were competing for local labor. It was a case of building housing at Oak Ridge for construction and operating forces or not having the manpower to build and run the plants.

So a new town was built. At first, it was to be a compact settlement of three thousand houses on the rolling southern slope of Black Oak Ridge, with dormitories, a business center, project offices, warehouses, and laboratories on the valley floor. But the requirements grew and ink was scarcely dry on one set of plans before they had to be reopened and extended.

Finally the new city of Oak Ridge stretched for seven miles along the slope with great masses of dormitories, hutments, and trailers spread across the valley. Such was Oak Ridge in wartime, the fifth largest city in Tennessee, where only cornfields and woodlots had been a few years earlier.

For security reasons and to insure speed in development, the entire area of the Clinton Engineer Works was acquired by the federal government, the general public was excluded, and all buildings and facilities were government-owned. That situation continued when the project was transferred to the Atomic Energy Commission in 1947. Therefore, while Oak Ridge had many aspects of a thriving normal city, with hustling shops and crowded schools and busy traffic, it remained a city completely owned and administered by the United States Government and accessible only to those who had business there and could present proper credentials at the closely guarded portals to the project.

OAK RIDGE IN TRANSITION

It is the announced intention of the Atomic Energy Commission to change this situation and give Oak Ridge as great a degree of normality as can be achieved within the bounds of security and the efficient operation of the program it is built to serve. The security barrier around the atomic energy plants is already being relocated so that the city will lie outside of it and be open to the public. The problem of incorporating Oak Ridge as a municipality, with its own local government and taxing power, is being actively studied. Plans are under way to allow private businessmen and organizations to build their own stores, theatres, ga-

rages, and other commercial facilities, and for religious and civic groups to build churches, clubhouses, and the like. Ways are being developed to permit individuals to buy or build their homes.

There are still major problems to be solved—legal, financial, administrative—before all of these things can be done. The purpose of Oak Ridge has not changed. No steps can be taken that will impair its ability to serve the people employed on the atomic energy projects. There is no present alternative to housing most of these people at Oak Ridge. No significant increase has yet taken place in the supply of housing outside the project area. But, insofar as security and operating requirements will permit, all steps will be taken to make Oak Ridge a self-governing, self-supporting municipality occupying a normal place among the other cities and towns of its region.

Oak Ridge is, therefore, in process of transition not only in the physical sense, changing over from temporary war facilities to permanent peacetime ones, but also in the legal and governmental sense, changing from a town wholly owned and operated by the federal government to one administered by its own citizens under established procedures of local self rule. Plans for its future must be evolved within that framework.

OAK RIDGE AND ITS REGION

Oak Ridge had an interesting birthplace. It lies in the Great Valley of East Tennessee, a southern continuation of the Shenandoah Valley of Virginia and part of the 1200-mile-long Great Valley that traverses the Appalachian Highlands from the St. Lawrence estuary to southern Alabama. Close by to the north and west of Oak Ridge rises the steep escarpment of the Cumberland Plateau and some forty miles to the east the Blue Ridge Mountains reach their greatest heights in the Great Smokies.

Down the Great Valley from headwaters in Virginia flow streams that unite with other tributaries at Knoxville to form the Tennessee River, core of the great regional development undertaking known as TVA. Six major hydroelectric plants and a large steam electric plant, with a total generating capacity of over 800,000 kilowatts, are located within fifty miles of Oak Ridge and a dozen or more others lie within economical transmission distance.

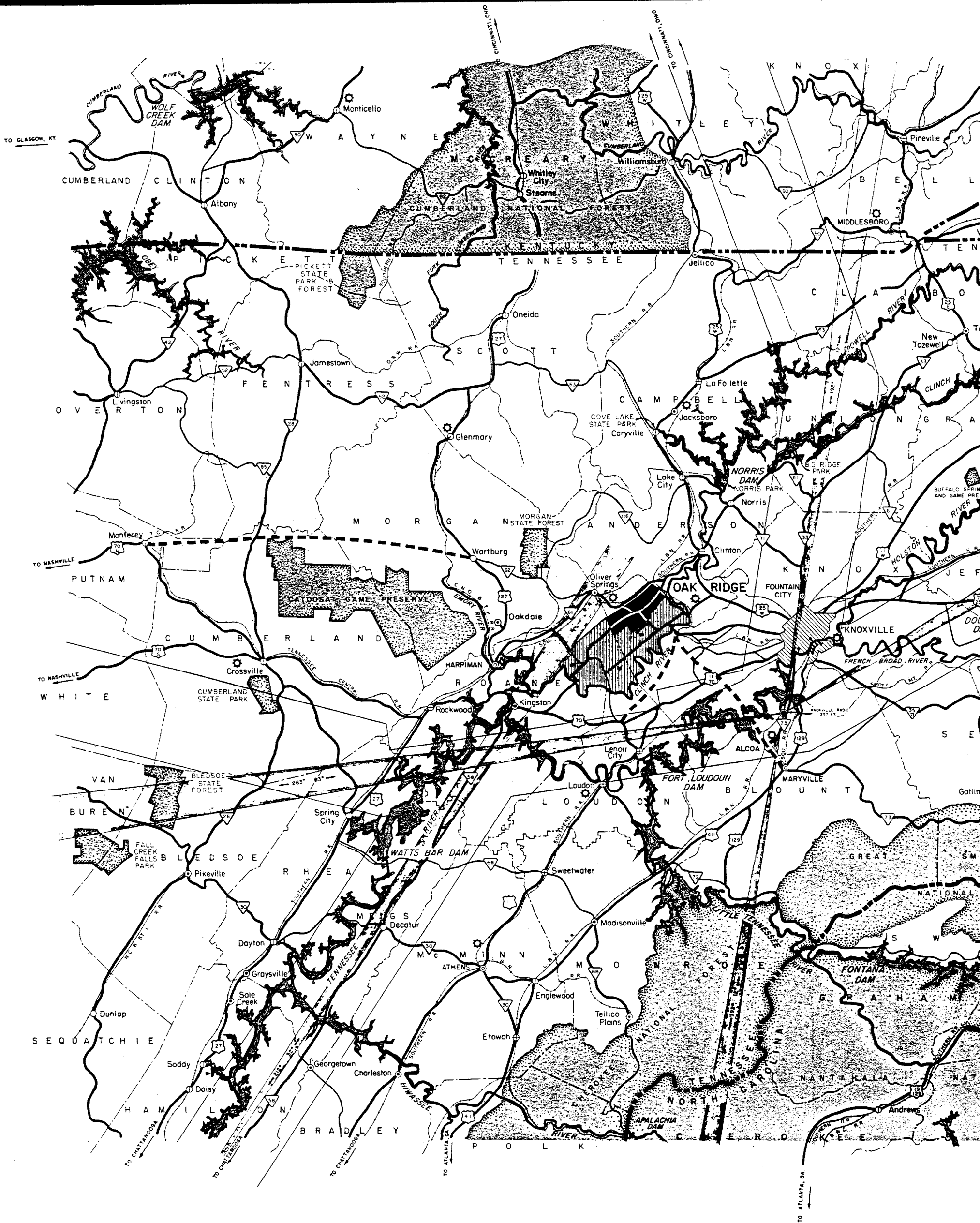
The reservoirs behind the dams form extensive lakes that join with the mountains and the forests to surround Oak Ridge with superb outdoor recreation facilities. The improved Tennessee River brings the project within the service area of the country's great inland waterway system. Coal is abundant in the nearby Cumberlands and huge acreages of public and private forest yield quantities of timber.

The Oak Ridge region is still predominately rural, flanked by wilderness in the adjacent mountains. The only city of more than 10,000 population, within seventy-five miles of Oak Ridge by highway, is Knoxville, twenty miles east, with an estimated current population of 140,000. Also, in this area, covering some 8500 square miles, there are only six other towns whose population exceeds 5,000. The next nearest cities of any size are Lexington, Kentucky, and Cincinnati, 190 and 285 miles on the north; Asheville, 115 miles on the east; Chattanooga, 114 miles on the south; and Nashville, 185 miles on the west.

When the Clinton Engineer Works was first established, it was the most secret of secret projects and contained potential hazards of unknown magnitude. Isolation was a more important factor in the choice of site than integration with the surrounding region. The city of Oak Ridge necessarily shared that isolation. It was fenced off from the outside world, and the few highways that traversed it were closed to public use.

For a project of such magnitude there had to be a base from which early operations could take off. The city of Knoxville furnished such a base. It was the hub of rail lines connecting with Washington, New York, Chicago, Cincinnati, New Orleans, Birmingham, Atlanta, and the East Coast. It had a good airport with commercial service to all principal cities. And while it had no surplus of housing or of labor, it was big enough to furnish hotel space and housing for some of the early personnel and an initial reservoir of construction workers.

Smaller take-off points were found at Clinton, a city with a 1940 population of 2,700, located six miles east of the project boundary, and Harriman, a small industrial city with a



1940 population of 5,600, located eight miles west of the western project boundary. Both were located on through-rail lines and on main highways. So Oak Ridge became established within the trade area of Knoxville, Tennessee, principal city of the eastern Tennessee Valley, and about midway between two small but established satellite communities west of Knoxville. Other communities in the vicinity were very small.

Oak Ridge achieved only a limited integration with its region during the war. In its early stages it drew heavily on the surrounding area for labor, housing, recreation, rail and highway service, but the outside world could come in only if it had business that was of value to the project and could stay only as long as that business lasted. That situation did not change materially with the end of the war, and the city has not yet caught up sufficiently with the service requirements of its own population to look around for outside contacts.

With the projected removal of the security barrier at the end of 1948, the city of Oak Ridge will enter a new era. People will be able to visit it and drive through it. Tourists will be attracted by the drama of its name. Residents of surrounding towns and rural areas will come for shopping, sightseeing, and entertainment. Oak Ridge will become a regional center in its own right, by far the largest satellite in the Knoxville area and actively competing with Knoxville in many respects, particularly in tourist interest and the types of business that are nurtured by the tourist trade.

So in its transition from wartime to peacetime city, Oak Ridge will undergo a third type of adjustment—adjustment to the economic and social life of the region of which it is a part.

TRANSITION ACCORDING TO PLAN

The three types of adjustment in the character and status at Oak Ridge that have been mentioned provide the underlying reason for the preparation of a Master Plan. Oak Ridge will change physically from a war-built city with many abnormal physical conditions to a peacetime city the facilities of which meet the usual requirements of a permanent population. It will change politically from a federally owned and operated project to a self-governing and self-financing municipality. It will change from a city necessarily isolated from its surroundings into a city carefully integrated into the life of its region.

There are all major adjustments of a kind that usually extend over many years of a city's life. But in Oak Ridge things happen swiftly. Change is the only tradition that Oak Ridge knows. Change is taking place today. Hundreds of new permanent homes and apartments are being built to replace emergency shelter constructed late in the war. An entirely new central business district is being planned to provide the facilities that could not be built under war limitations. New roads are being built to handle traffic when the city is opened to the public and its full business and social life is developed. New and fundamental problems of local government, public finance, and the ownership and operation of property are being faced. Oak Ridge cannot take time out to adjust to these new conditions. It must take the adjustments in stride, while continuing to serve, and serve well, the atomic energy program that is still its sole reason for existence.

Basic change and quick change can spell chaos unless carefully planned. In the transition from war to peacetime activity, Oak Ridge could become a jumble of buildings and facilities that would defeat economical administration of the city and efficient operation of enterprises carried on within it. Such things can happen. But they can also be avoided. They can be avoided by giving careful thought to the kind of city Oak Ridge should be and must be to serve its basic purpose, and by making advance preparation for the changes that must take place to fit it for that role.

Such is the purpose of the Master Plan. Within the area available and suitable for the building of the city it seeks to find the areas best suited for residential use and reserve them for that purpose, free from encroachment by inharmonious developments. It seeks to find the area most convenient to the people of the future city and best suited to the building of commercial and civic structures and related traffic-ways, and to establish that area as the center of the city's commercial, civic, and cultural life.

It seeks to find suitable locations for the schools that will serve the city's children and

also will provide educational and recreational facilities for adults. It seeks to gauge the traffic that will flow into and out of the city and between its various sections, and to make sure that highways are provided in the right locations and of adequate design.

In working out the physical pattern of the future city, a pattern that will be filled-in year by year as needed, the plan takes into account the type of administrative organization that is likely to operate the city and the types of private activity that are likely to take place in it so that the physical structure will be one that is simply and economical to operate and one that will facilitate business activities and make home life pleasant. That is a large order but it can be filled.

HOW THE MASTER PLAN WAS MADE

The process of preparing a Master Plan for a city can be divided into four parts:

1. Finding out what the city is likely to need in the way of space and physical facilities over the contemplated period, say in the next twenty-five years.
2. Analyzing its present structure to see how well it meets those requirements and in what respects it is deficient.
3. Designing a modified structure that will take care of anticipated needs, utilizing all parts of the existing structure that are satisfactory by rearrangement or remodeling.
4. Preparing a general development program under which the changes can be brought about in an orderly way as needed.

To make such studies and analyses for Oak Ridge, the Atomic Energy Commission turned to the same architectural and engineering firm which had prepared the original plans for construction of the city during the war. It also set up a panel of town planning consultants of outstanding ability and reputation to review periodically the work in progress.

Under the contract between the Atomic Energy Commission and the Architect-Engineer, effective July 15, 1947, the work of plan preparation was carried forward in four stages:

- A. Collection of data and preparation of maps.
- B. Analysis of existing structures and utilities.
- C. Preparation of preliminary Master Plan for review by City and A.E.C. officials.
- D. Preparation of the final Master Plan report, portrayed in text, maps, and illustrations.

Because of the urgent need for new permanent housing to replace temporary and sub-standard structures, and the necessity of building it without disturbing the occupancy of other usable dwellings, several major decisions about the future structure of the city had to be made before the Master Plan was completed. These decisions were made on the basis of preliminary studies and were confirmed by the later work. Because of this fact, the publication of the final Master Plan report finds many of the recommendations in process of execution and others largely committed by the events that have taken place since its beginning. For that reason, certain references to existing conditions in the report may describe conditions that existed when the studies were made but which since have materially changed. Similarly, recommendations for future work may include cases where the recommended work is already completed or well under way. Insofar as possible, these situations have been noted in the text relating to the details of the Master Plan.



PHYSICAL FEATURES

OAK RIDGE, TENNESSEE
FEDERAL RESERVE BANK, COMMERCE
EDUCATIONAL, AND RESEARCH CENTER — ENGINEER

1000 500 0

CHANGES IN TERRAIN ARE AVAILABLE TO THE PUBLIC

NEW CONTROLLED AREA FENCE

OAK RIDGE IN 1948

Before Oak Ridge could be planned as a permanent city, the conditions which influenced the building of the city in its present form had to be studied and all existing facilities appraised as to their future usefulness in the community. Existing conditions and facilities imposed limits as to what could be accomplished in future development.

To determine these controlling conditions it was necessary to study Oak Ridge from the standpoint of its site, the present use of land, the buildings and other facilities now built, population characteristics and trends, and the effect of government ownership on past and future development.

THE OAK RIDGE SITE

The ninety square miles which constitute the site of the atomic bomb plants and the city of Oak Ridge lie within a bend of the Clinch River which extends along most of the eastern, southern, and western boundaries of the reservation. The northern boundary follows the crest of Black Oak Ridge. The land consists of a series of valleys separated by parallel ridges about 300 feet high, spaced one to two miles apart. The topography of the land was ideally suited to its ultimate purpose. It permitted the location of the atomic plants in separate valleys shielded from each other and from the city. However, the topography greatly influenced the present design of the city, and it has had equal bearing on the planning of the future development of Oak Ridge even to the extent of limiting its ultimate growth.

In January of 1943 the location of the city to house the plant workers was chosen. It lies in the northeast corner of the reservation in a valley between two lines of parallel ridges. The city derives its name from Black Oak Ridge, which forms its northern boundary. The ridges hold the city in a trough and have forced its development to stretch out for seven miles along the valley. The influence of the topography on the layout of the city goes beyond its size and shape. It also controlled the locations of the various kinds of buildings required. Because the comparatively flat area at the bottom of the valley was needed for dormitories, warehouses, and commercial facilities, most of the family dwelling units had to be located to the north on the crest and on the south slope of Black Oak Ridge.

This wooded hillside land afforded the opportunity for creating residential neighborhoods of unusual attractiveness. It also presented many problems. The hillside is by no means a gentle, uniform slope as will be noted on the map, "Physical Features." Much of it is steep and rugged terrain cut by many ravines which are separated by secondary ridges and spurs.

The planning of residential neighborhoods of reasonable density was difficult a job. The location of the roads, utilities, and houses and the density of development were rigidly controlled by the topography. Future development of this area similarly will be controlled and housing density actually will be decreased as the small, closely-spaced temporary dwellings are replaced with more adequate houses.

PRESENT USE OF LAND

The map, "Present Land Use," graphically shows the present pattern of the city and the consequences of its very rapid growth during the war years. As defined by the present established city limits, it includes an area extending approximately seven miles from east to west and averaging two miles from north to south. This total area is approximately 9,000 acres or fourteen square miles. Oak Ridge Turnpike, the main traffic artery, divides the area into two nearly equal sections of almost complete divergence as to use and character of planning.

The land north of the Turnpike is almost completely residential. Here the houses for the plant workers were built together with the schools, shopping centers, the hospital, churches, and recreation facilities. Even this area, however, shows what can happen in a rapidly expanding city, no matter how carefully planned. Oak Ridge originally was intended to be a city of 12,000 people, extending from the Turnpike to the crest of the Ridge and from California Avenue on the east to Pennsylvania Avenue on the west. This was a well-planned, integrated community consisting of three neighborhoods, each with its elementary school and neighbor-

hood stores. Centrally located were the Oak Ridge High School, the hospital, and Jackson Square, the main business section, all designed for the needs of 3,000 families.

Long before this town was completed, plant expansion and the need for much more housing completely upset the program for a planned community of moderate size. Almost overnight the housing demand jumped—first to 5,000 dwellings, then to 7,000, and eventually to more than 10,000. First the city grew toward the east, with a new neighborhood between California Avenue and the eastern boundary of the reservation. Blocked at this point, it then grew west in successive stages, ultimately extending three miles beyond the originally contemplated western limits of the town. These additions to the town were well-planned, too, insofar as the necessity of completing some hundreds of houses each month permitted. It was too late however, to do anything about the central facilities. Jackson Square was nearly completed and afforded little opportunity for expansion. A second business center, therefore, was built at Grove Center. The hospital expanded with wings much larger than the original fifty-bed, one-story building. An addition was made to the High School and a junior high school system set up to relieve the load. The demand for dormitory accommodations grew from 2,500 to 13,000 beds. Again there was no room in the planned dormitory area near Jackson Square, and a dormitory city grew up far to the west on the only available level land. To serve these new dormitories, another shopping center, Jefferson Center, was built.

The development of the area south of the Turnpike was a different story. Except for the Administration Building, initially planned in a location close to the center of the original town, the area became a catch-all for all of the various wartime service facilities, including repair shops, storage yards, warehouses, and the like. Here also were located most of the temporary trailer and hutment camps which housed the last influx of war workers.

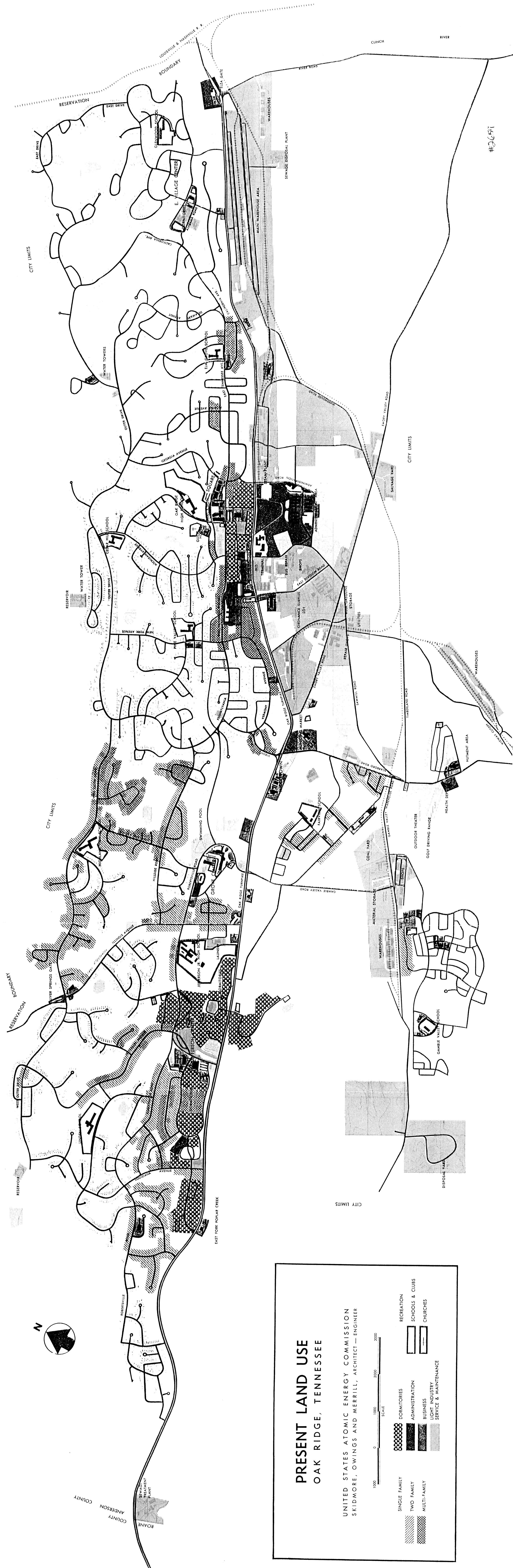
This was the physical development of the city at the peak of its population in August 1945, when 75,000 people lived at Oak Ridge. With the completion of the major construction of the plants and the city, the population has dropped to 36,000. Many of the original temporary living quarters such as trailers and barracks have been removed. Some of the temporary dormitories have been demolished. Others have been converted into apartments and others are being used for storage warehouses, administrative and private offices. Cafeteria buildings, laundry and other buildings originally built for specific purposes throughout the city are being utilized for various commercial and light industrial uses. Other temporary construction buildings and sheds also are being used for these purposes. Several new commercial structures also have been built in isolated locations. All of these present isolated individual land uses which are in variance to the original development of the city will be noticed readily on the map.

While some of this change has taken place north of the Turnpike, the greatest change is in the area south of the Turnpike where the remaining facilities are generally scattered and unrelated to each other and to the city plan.

EXISTING BUILDINGS AND FACILITIES

In order to determine whether the remaining existing structures, roads, and utilities were functionally suitable for continued permanent use, or for limited or alternate uses, or should be disposed of and replaced, a survey of all of the physical facilities was made. The findings of this survey are described in detail in the Phase B Master Plan report "Analysis and Report of Existing Facilities." They are briefly summarized in the following descriptions and are illustrated on the map "Physical Condition of Buildings."

As Oak Ridge stands today, less than one-third of its buildings are of permanent construction. The remaining two-thirds vary from semi-permanent structures having considerable remaining useful life, to the most dilapidated wartime hutments still used for housing, small retail shops, and other miscellaneous purposes. Since the close of the war, however, the city has made considerable progress toward growing out of its camptown atmosphere. Many miles of streets have been paved, marked with traffic and parking lanes, and provided with concrete curbs and gutters. Permanent sidewalks are being constructed. More than 5,000 unsightly trailers have been removed. To the occasional visitor, the continuous progress toward a permanent city is evident. A tremendous job, however, still remains.



HOUSING

Oak Ridge, like most cities today, has an acute housing problem. However, in Oak Ridge the problem is not just the simple fact of not enough housing. It is accentuated by the fact that so much of the available housing is of temporary or of sub-standard character. This is strikingly evident from the following table:

EXISTING HOUSING

Estimated Life of Building	Number of Units						Type of Unit
	Family		Dormitory		Total		
	No.	Per Cent	No.	Per Cent	No.	Per Cent	
Permanent	3,663	39			3,663	29	Cemesto - K, L and N A-1, A-2, A-3 Apart- ments
Semi-Permanent	80	1					Converted H-type Dor- mitories
			1,507	48			H-type Dormitories
					1,587	13	
Temporary	4,831 42	51 1					TDU-TVA-T, U, S and V
			855	27			Converted S-type Dor- mitories
					5,728	45	S-type Dormitories
Sub-standard	893	8					Victory Cottage and Hut- ments
			808	25			4-Person Hutments
					1,701	13	
Total	9,509	100	3,170	100	12,679	100	

Housing for single workers presents no immediate problem, owing to the decrease in the number of such workers since the war and the adequate number of wartime dormitories of semi-permanent construction. With respect to housing for families, however, the situation is quite different. Even including nearly 1,000 temporary shelters built as substitutes for trailers, there are not enough houses to satisfy the present demand. The necessity for continuing the occupancy of hutments and so-called victory cottages has forced many families to live under conditions which are far below minimum standards of health and welfare. Furthermore, the continued use of the better types of temporary dwellings, which are also sub-standard, has imposed a maintenance burden on the A.E.C. entirely out of line with an economically sound housing operation. Complicating the problem is the necessity of replacing large numbers of houses and still maintaining available housing at approximately the present volume.

Fortunately, most of the permanent housing is concentrated in three neighborhoods. These neighborhoods, which constituted the originally-planned town of 3,000 houses, are well-planned, attractive, and already have taken on the character of a mature and desirable residential community. The job of rebuilding the housing starts with a nucleus of these three

neighborhood units complete with schools and other community facilities.

The map, "Physical Condition of Buildings," and the accompanying illustrations show the character and location of the various types of existing housing.

SCHOOLS

The Oak Ridge school system is acknowledged as one of the best in the region. Its buildings and physical equipment, however, reflect its wartime birth. The pattern of school construction parallels that of the housing—first, a well-planned high school and three elementary schools of permanent construction serving the permanent housing of the initial town development; second, additional elementary schools of less permanent construction serving the new neighborhoods to the east and west; and finally, structures of minimum temporary construction for the children living in the trailer camps and hutment areas south of the Turnpike.

The Oak Ridge High School is a well-planned permanent building, designed for 500 students—later, through additions, increased to 750 capacity. It is now crowded, and, owing to site limitations, not capable of further expansion. The Jefferson Junior High School is a temporary structure. Starting as an existing country school house, it grew tremendously by means of additions and at one time during the war accommodated 2,000 elementary school children. Shortly before the end of the war, in order to relieve pressure on the high school, it was converted to a junior high school.

Oak Ridge now has nine elementary schools, all working to capacity. The Cedar Hill, Elm Grove, and Pine Valley Schools, with a total capacity of about 1,500 pupils, are permanent buildings, well-designed and well-located to serve the three permanent neighborhoods. The Glenwood, Highland View, and Linden Schools, although considered as temporary buildings, are well-planned and substantially built. With some renovation, their useful life can be continued for a considerable number of years. The Fairview School south of the Turnpike can be considered only as an emergency facility pending new school building construction. The Gamble Valley School will require considerable renovation to extend its useful life. The Scarboro School, a well-constructed building is within the new security area and, therefore, will have to be relinquished for some other use.

COMMERCIAL BUILDINGS

One of the most noticeable differences between Oak Ridge and a normal community is its lack of commercial facilities. There is no central business district as such. Jackson Square, the largest and most popular shopping center, was designed to serve only 12,000 people and is limited in its scope and variety of retail services. Grove Center and Jefferson Center are smaller commercial centers serving the west end of the city and the former dormitory area. Other facilities include some permanent and well-planned neighborhood stores, a few temporary neighborhood stores and miscellaneous small enterprises scattered along Oak Ridge Turnpike. Less than one-third of the total number of buildings being utilized for commercial purposes are of permanent construction, and most of these are in the three original neighborhoods built around Jackson Square.

Statistics show that Oak Ridge people buy their normal supply of groceries and drugs from Oak Ridge merchants but that they shop in Knoxville or elsewhere for most of their clothing and durable goods. The present plan to open the city and encourage private business enterprise should lead to the early development of a central business district providing an adequate number and variety of retail stores and other commercial facilities.

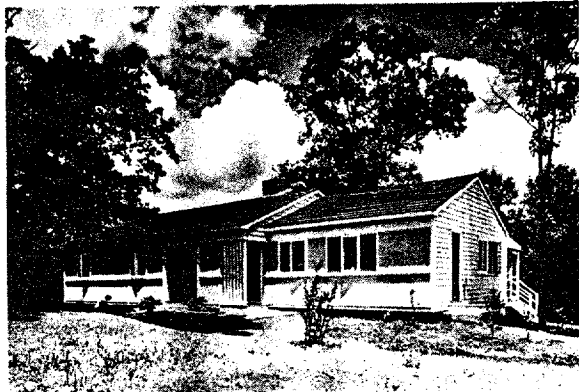
OTHER BUILDINGS

Included in this group of buildings are those being used for A.E.C. and city administration, service and maintenance purposes, recreation, churches, bus service and repair, and other miscellaneous and special uses. A very small percentage of these buildings were built for permanency.

PHYSICAL CONDITION OF BUILDINGS

PERMANENT

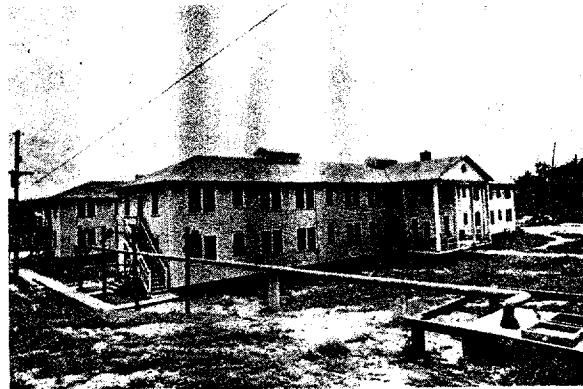
There are 3663 permanent housing units in Oak Ridge, representing approximately one-third of all of its housing. On the map these units are shown in yellow. They include 2450 Cemesto-type single-family units similar in design to the one illustrated at the right, 150 Cemesto-type four-family units, the K, L & N types of conventional frame construction and three Cemesto-type apartment buildings. Of all the Oak Ridge housing, these units provide the most satisfactory living conditions and architectural appearance.



Cemesto

SEMI-PERMANENT

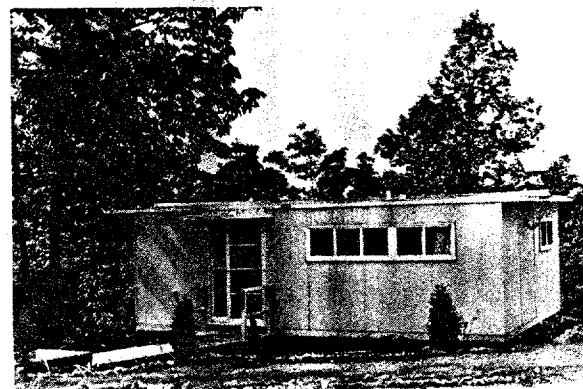
The semi-permanent housing, shown on the map in orange, consists of 46 H-type dormitory buildings of which only 15 are now used for housing purposes. These 15 buildings provide 1587 housing units consisting entirely of dormitory accommodations, except for 80 apartments converted from dormitory rooms. Constructed on masonry wall foundations with conventional wood siding and asphalt shingle roofs, these buildings are generally in good condition and suitable for continued use as dormitories.



H-Type Dorm

TEMPORARY

Shown on the map in red are the 5728 housing units classified as temporary. Of these units almost half, 2621, are T.V.A. type, 897 are in S-type dormitory buildings, 970 are T.D.U. type, 744 are S and V types, and 500 are T and U types. Typical of these units is the T.V.A. type. It is small, its exterior walls are plywood, its foundation is wood, and the heat is supplied by a coal stove in the living room. Like most of the temporary housing in Oak Ridge, it has been built at densities greater than desirable.



TVA

SUB-STANDARD

Classified as sub-standard and in need of immediate replacement are the 1020 "Victory Cottages" and hutments. These units shown in brown, are south of the Turnpike along Scarboro Road, adjacent to Fairview School, north of the Turnpike near Grove Center, and along Louisiana Avenue. The "Victory Cottages" were designed as substitutes for trailers and provide bare minimum living facilities. The 280 hutments are even worse; they are without running water, toilets, glass windows, or winter insulation.



VC-1

ROADS AND UTILITIES

The existing roads north of the Turnpike are well designed to serve the present and proposed residential neighborhoods. Much of the road system has been paved and provided with permanent curbs and gutters. To the south of the Turnpike, most of the roads serving the various scattered warehousing and service facilities, and formerly serving the trailer camps, will probably be abandoned or relocated in any plan of future development.

The basic parts of the water supply, sewerage, and sewage disposal systems, as they now exist, with improvements now planned, appear to be generally adequate for the proposed future development of the city, and lend themselves well to extensions to serve the new areas.

THE OAK RIDGE POPULATION

Statistics show that the average citizen of Oak Ridge is the head of a family averaging 3.34 persons and earns \$3,150 per year. He is permitted to live in Oak Ridge only because he works in one of the atomic plants, is employed by the A.E.C., or is otherwise employed in the operation or business of the city. In keeping with its short history, Oak Ridge is a city of young people. In 1948, forty-two per cent of the population were between twenty and forty years old and another forty per cent were under nineteen. These percentages are far above national averages.

The present population of Oak Ridge, estimated at 36,000, is fixed by the available housing, occupancy of houses being as close to 100 per cent as normal turnover permits. The decline from the wartime peak is in part due to the removal of more than 5,000 trailers and other emergency housing units. Another factor has been the decline in dormitory residents from 13,000 to less than 3,000. During the war emergency, many married workers moved to Oak Ridge without their families and lived in dormitory rooms. These workers now have either obtained family quarters or moved elsewhere.

The racial composition of Oak Ridge, as well as its total population, is fixed by the housing supply. The present negro population is less than four per cent of the total, which is well below the average for other cities of the region.

During the years to come, the population may be expected to increase to the extent that adequate new family housing is built. Oak Ridge now houses only sixty-two per cent of its workers. Although plant employment is expected to remain at about its present level, the trend toward normal city will greatly increase the number of workers in its business establishments and services.

EFFECT OF GOVERNMENT OWNERSHIP

Oak Ridge and the atomic plants were built by the government and remain today under government ownership and operation. Government ownership has had both a beneficial and an adverse influence on the development of the city. It afforded the opportunity of creating a complete, well-planned community insofar as the expediency of war construction permitted. On the other hand, the condition of government ownership has discouraged the adequate development of many needed community facilities such as adequate shopping, church, and recreation facilities. The government did not supply more than a minimum of such facilities, and their development by private enterprise, so far, has been restricted to short-term concessions.

During the war, security demanded that the entire reservation, including the city as well as the plants, be enclosed with a patrol fence. Outsiders were not admitted to the city except on official business or to visit friends in Oak Ridge. The closed city created an abnormal condition, particularly unfavorable to normal development of commercial facilities.

It appears highly probable that Oak Ridge will soon become a much more normal city. This will be accomplished in three steps. The first step, to be accomplished shortly, is the removal of the patrol fence now encircling the city. A new patrol fence will be built between the city and the plants to restrict the public from the plant areas. This will open Oak Ridge

to the public and will stimulate normal retail trade, commercial recreation, and other functions. At the same time it will bring new problems such as traffic control and police protection. The second step is private ownership of real property within Oak Ridge, either on the basis of sale or long-term lease of land, thereby further stimulating the development of needed facilities by private enterprise. The third step is the incorporation of the city as a self-governing municipality.

Whether the city remains under government ownership or becomes a more normal city largely under private ownership does not affect planning principles as developed in the Master Plan. It will, however, have an important bearing on the machinery through which the Master Plan is to be carried out. Furthermore, it seems evident that the need for the Master Plan as a controlling influence in the development of the city increases as government controls are relaxed.

ASSUMPTIONS ON WHICH THE PLAN IS BASED

In order to prepare the Master Plan for Oak Ridge, it was necessary to make a number of basic assumptions regarding the future size and character of the community. These were worked out in preliminary studies and conferences between the planning staff, the consulting panel and city officials, and were reviewed by the officers of the Atomic Energy Commission in Oak Ridge and Washington. Some of the assumptions subsequently have been modified in the light of later developments. They are stated here as they apply to the plans and recommendations presented in the report.

ASSUMPTION 1—SIZE OF THE CITY

The population of Oak Ridge is now (1948) approximately 36,000. It is assumed that it ultimately may grow to approximately 50,000.

This assumption is based on estimates of employment in the atomic energy program and related services, on the physical characteristics of the site, and on policy considerations affecting the total figure.

A maximum of 50,000 population is set by the physical characteristics of the site.* The area in which the city can expand with reasonable economy is limited by the rough topography and by the barrier formed by the plant area to the west. The topography not only places limits on the amount of land that may be used for residential purposes but it also limits the practical density of development. While desirable densities would limit the total population to around 50,000, the figure can be raised perhaps ten per cent without creating a situation involving excessive costs or one that is unattractive to the type of resident the community is designed to serve.

There are other reasons for fixing the upper limit of population at the 50,000 to 55,000 level and adopting positive measures to prevent growth beyond that point. The physical plant or structure of a modern city—streets, buildings, utilities—is very costly. It cannot be designed on an economical basis except in terms of a known or assumed load. An automobile manufacturer cannot design an economical car for five people that will serve ten people just as well. Likewise a city planner cannot design an economical city for 50,000 population that will serve twice that number just as well.

If the population materially exceeds the design load, one of two things will happen. Either the population will be badly served by facilities that are inadequate and congested, or the facilities will be made over at terrific expense. It is just such situations that are bringing many American cities to bankruptcy. Sound city development and operation call for the setting of fixed limits of size and the accommodation of growth beyond that point in the same way that increased demand is met by automobile manufacturers—by building additional units, not by overloading the ones already in use.

Finally, there are reasons of national security for holding urban communities to reasonable size, and taking care of increases in urban population by building more cities in dispersed locations rather than by adding indefinitely to the size of established centers. The National Security Resources Board, in its recent report on Security Factors in Industrial Location, recommends cities of not over 50,000 population.

For the above reasons, a "design load" of 50,000–55,000 people has been assumed as a basis for the Oak Ridge Master Plan and it has been further assumed that positive measures will be taken to prevent the city from exceeding that total. Suggested measures are discussed in "Details of the Master Plan" (see page 83).

ASSUMPTION 2—PURPOSE OF THE CITY

Oak Ridge originally was established for the sole purpose of housing personnel associated with the atomic energy program and related services. That continues to be the city's primary purpose and it is assumed that it will so remain for some time to come.

* The war population of 75,000 was accommodated by extensive use of barracks, trailer and hutment camps, and high density developments of a temporary nature.

In the interest of a more balanced economy and a more normal composition of the resident population, it would be desirable to broaden the purpose of Oak Ridge to include the service of industrial and commercial enterprises not connected with the atomic energy program and the housing of persons who are not locally employed. However, the requirements of the primary program absorb so large a proportion of the total housing supply, present and potentially, that can be made available at Oak Ridge that no large amount can be allocated to other purposes.

The amount that could be so allocated would be increased if (a) the primary programs were reduced in scope so as to require less housing, or (b) additional housing for plant operators and service personnel became available in other nearby communities. Until one or both of those situations develops, Oak Ridge must remain primarily a service center for the atomic energy installations, and the admission of activities not related to such service must necessarily be limited.

If a broadening of the economic base and a more normal composition for the resident population are considered important to the future of Oak Ridge, then the provision of housing for plant operators at points other than Oak Ridge should be actively encouraged and a larger percentage of the Oak Ridge supply made available to others. There are a number of small towns to the west of the plant areas which are within reasonable commuting distance and which might support additional housing for plant workers. There are also sites between Oak Ridge and Knoxville which might be developed as new residential satellites if proper sponsorship could be found. There may be sites for one or two small residential villages suburban to Oak Ridge within the project area.

ASSUMPTION 3—SECURITY REGULATIONS

It is assumed that the security barrier which now excludes the general public from Oak Ridge will be removed by the end of 1948 or early 1949, and that there will be no restrictions thereafter on access to or passage through the city beyond the police regulations normally encountered in a city of like size.

ASSUMPTION 4—GOVERNMENT

It is assumed that within a reasonable time Oak Ridge will acquire the status of an incorporated municipality with local self-government, and that municipal services and utilities now operated by or on behalf of the Atomic Energy Commission will be operated thereafter by the city. It is assumed further that a basis for financing these services will be worked out as a part of the arrangement for local government.

ASSUMPTION 5—REAL ESTATE OPERATIONS

Up to the present time, with very minor exceptions, all real property in Oak Ridge has been owned, built, and operated by or on behalf of the United States Government. It is the desire of the Atomic Energy Commission to transfer to private enterprise as much of the responsibility for real estate operations as can be done without impairing the utility of Oak Ridge as a center for program operations. While the exact mechanics and timing for such transfers remain to be worked out, it is assumed for the purpose of the Master Plan that the normal division between public and private operations will be approached in Oak Ridge.

Under this assumption the control over the use and development of the area that has been exercised heretofore by the government, as sole owner of both land and buildings, will no longer be operable. Other types of control, therefore, will be needed to insure that the general outlines of the plan are followed, with respect both to public improvements and private developments, and that when modifications in the Plan are required they will be made in an orderly way. Without such controls the Plan could become nullified quickly and the economy of orderly city development and operation lost.

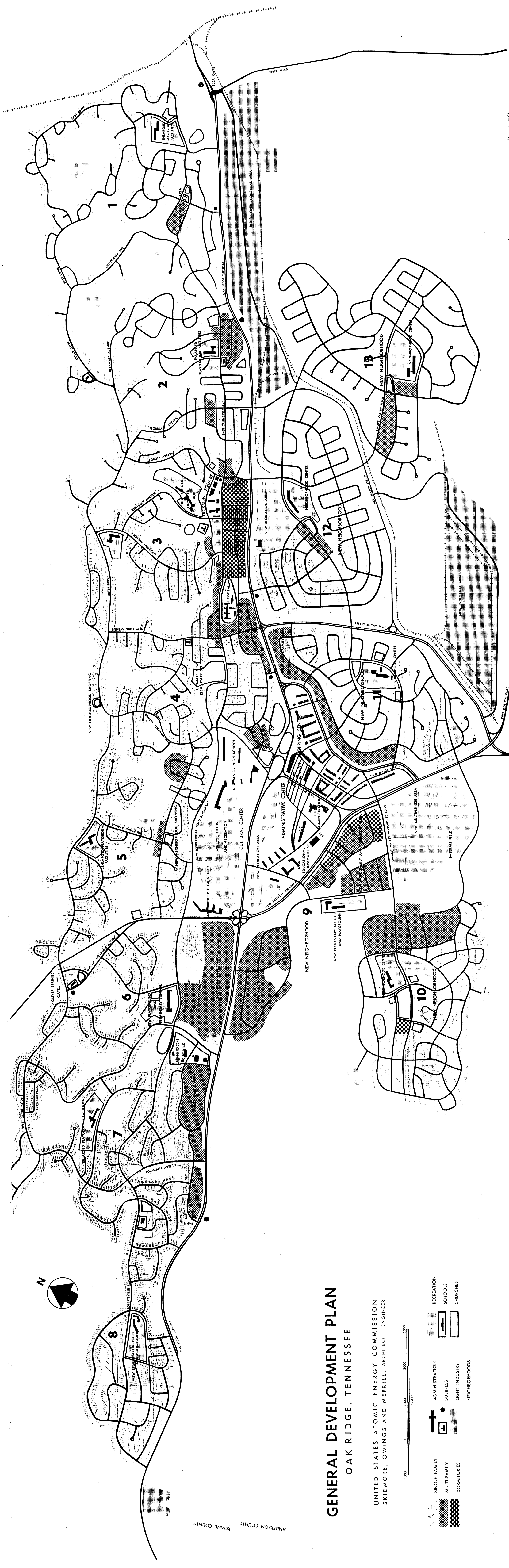
The section, "Effective use of the Master Plan," of this report outlines recommended types of land use and building control, modelled on those used in other progressive American cities. These are designed for application through regular democratic processes and for adoption and modification through the same channels, except that interim measures having the same effect may be required pending the establishment of a local city government. The Master Plan is based on the assumption that these or equivalent measures can and will be adopted and enforced.

ASSUMPTION 6—ADMINISTRATION OF THE MASTER PLAN

The Master Plan is not intended to provide a rigid and inflexible framework for the development of the city. It would not be suited to the dynamic needs of a young community if it were. There must be machinery for the continuing administration of the Plan capable of accomplishing wise modifications where the letter and the spirit of the Plan are not in full accord or where new conditions have arisen that justify a change. This machinery must be capable also of preventing capricious variations from the Plan that will impair its usefulness. Such machinery is recommended in this report and the Plan has been prepared on the assumption that it will be established.

ASSUMPTION 7—FINANCING OF DEVELOPMENT

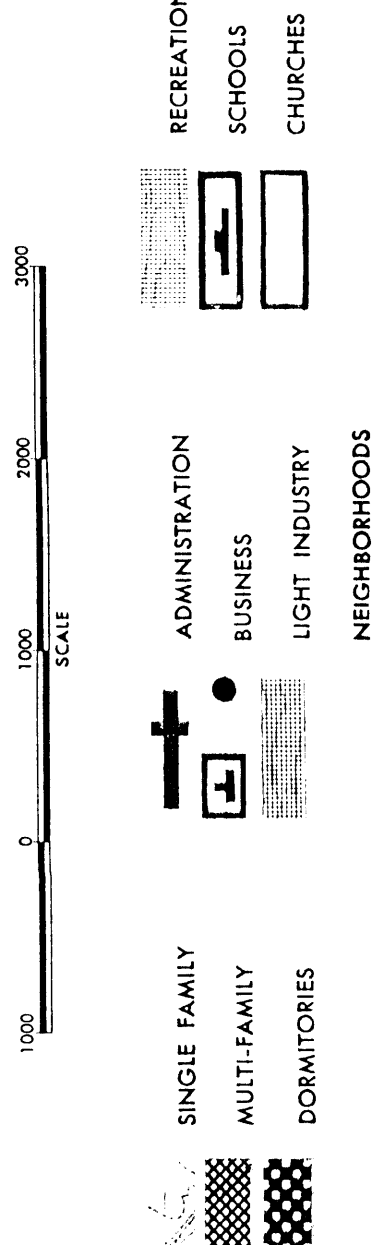
In line with other assumptions, it is assumed that arrangements for financing the developments contemplated by the Plan will approach, over a period of years, those prevailing in a normal city of like size. Prior to that time, however, it is assumed that the Atomic Energy Commission will finance installation on a permanent basis of the public improvements essential to the operation of the city at the scale required for its program.



GENERAL DEVELOPMENT PLAN

OAK RIDGE, TENNESSEE

UNITED STATES ATOMIC ENERGY COMMISSION
SKIDMORE, OWINGS AND MERRILL, ARCHITECT — ENGINEER



THE MASTER PLAN

The Master Plan for Oak Ridge is a plan for the physical arrangement of the city. It is comparable to the floor plan of a house. Oak Ridge is primarily a residential community to house the people associated with the atomic energy program. The plan must allot space to the various rooms and corridors that those people need while living there.

A house for so large a family must be arranged carefully if life within it is to be pleasant, housekeeping easy, and the budget kept within reasonable bounds. There must be living rooms and sleeping rooms, work rooms and service rooms, business offices, connecting corridors, systems of wire, pipes and ducts to carry electricity, telephone and other utilities to the places where they are needed. The rooms must be of the right number and size for their respective purposes; they must be conveniently arranged in relation to one another; corridors must be adequate; and utility lines must have the right capacity and be in the right locations.

The Master Plan for Oak Ridge provides living and sleeping rooms in the form of residential neighborhoods, work rooms in the form of the central shopping area and various service centers, offices in the form of the central administrative headquarters for the A.E.C. and the city, corridors in the form of streets, recreation rooms in the form of parks and playfields, and intricate systems of pipes and wires that supply the rooms with utility services. The object of the Master Plan is to make sure that within the outer walls of the city structure there are enough of these rooms of the right kinds and sizes in the right locations and that circulation between them and utility services to them are adequately taken care of.

Reference to the outer walls of Oak Ridge is not a mere figure of speech. The walls are very real: the steep north slope of Black Oak Ridge on the north, the sharp Pine Ridge and adjacent rough terrain on the south, the railroad and other barriers to the east, and the county line and associated topographic limitations to the west. These walls enclose a more or less rectangular valley, which form the total "floor area" of the city. It cannot be expanded economically. Within it must be arranged all of the rooms, corridors, and utilities that the city needs for pleasant, efficient, economical living.

The concept of "rooms" or special purpose areas for the various activities that make up the city's life is a basic one in the formation of the Master Plan. Because the primary purpose of the city is to provide good living accommodations, the living "rooms" or areas receive first attention. They consist of thirteen residential districts or "neighborhood units." These are areas averaging four to five thousand feet across and as compact as the topography will permit. Each neighborhood unit is designed to house approximately 3600 people and is served by a centrally located elementary school and neighborhood shops.

The principal work room of the city is the downtown business area, a centrally located section designed to contain the main retail stores, bus terminal, hotel, commercial amusements, and like facilities. Other central service or special purpose areas are associated with it, notably an area for the administrative offices of the A.E.C. and of the city, and an area for the Senior High School and associated educational and recreational facilities. There are additional service areas of various kinds and sizes, such as secondary shopping centers at Jackson Square and Jefferson Center, the hospital, and two warehousing and light industrial areas at the south and east extremities of the city.

Because of the city's long narrow shape and the fact that there are important traffic destinations beyond it at both ends, these rooms are arranged along a main corridor or avenue, Oak Ridge Turnpike, that runs the full length of the city through the center of the valley. Beyond the city it connects with one of the principal employment centers to the west and with main highways, railroads, and nearby towns to the east. A cross-corridor formed by linking the present Scarboro and Oliver Springs Roads, enters the city about midway of its southern boundary and cuts obliquely across it to the northwest. This connects with main employment centers and with the Knoxville highway to the south, and with a highway network to the north that leads to Cincinnati, Louisville, Nashville, and Chattanooga.

The general plan of the city is, therefore, like the plan of a long narrow house that has a central corridor running its full length to doors at the two ends, with rooms opening on both sides of it, and a cross-corridor about midway of the structure running between doors on the north and south. It would be difficult to say which of the four doorways to Oak Ridge is the "front door" because all are vitally important to the city's life, but for descriptive purposes

that title may be given to the one on the south. It faces toward Knoxville and is the principal point of entry for traffic from that center. This traffic will grow in volume and importance as Oak Ridge becomes established in the life of the Knoxville region.

The central work rooms of the city are placed just inside this southern entrance, grouped around the junction of the two main corridors, so that they are accessible both to outside visitors and to the city's residents. The site of the permanent administrative center for the Oak Ridge operations of the A.E.C. is there, with associated research and educational institutions, at a point that is equally convenient for outside contacts, for contact with the nearby atomic energy plants and for travel to and from the homes of the people they employ. Next to it on the east, and equally accessible to all who use it, is the location of the central business district. Just to the north, on the opposite side of Oak Ridge Turnpike is the site for the central high school, its playfields, and associated facilities for the city's cultural life and recreational activities. These three central areas together form a rough triangle, about five thousand feet on a side, with one point close to the south entrance to the city and the other two points extending east and west along the Oak Ridge Turnpike. The new north-south highway formed by joining Scarboro Road with Oliver Springs Road forms the west side of this triangle and a new cut-off road forms its eastern side.

Eight of the thirteen residential neighborhoods are ranged along the north side of Oak Ridge Turnpike. On the "General Development Plan" they are numbered consecutively from east to west. They occupy the south slope of Black Oak Ridge and the small portions of the valley floor north of the Turnpike and include all of the existing residences and related facilities of a permanent or semi-permanent character. They also contain many existing temporary residential structures which should be replaced over the years with permanent ones.

The remaining five neighborhood units are located south of the Turnpike, two to the west of the city center and three to the east. Their sites were either vacant during the war or were occupied by barracks, trailer camps, hutments, storage yards, or other facilities that had little or no permanent value to the city. Therefore, they are being planned as completely new areas. Permanent housing is being built now in Neighborhoods 9, 10, and 11, nearest to the future business center. Neighborhoods 12 and 13 are reserved for future development as the city approaches its ultimate size.

Such is the general composition of the Plan in the simplest terms. There are many added features that are essential to it, without which it could not furnish a good basis for the development and operation of the community. The more important ones are briefly reviewed below and are treated in greater detail in the section "Details of the Master Plan."

The Plan is not a plan for just any city but for a particular city, a city located at a particular point in the United States for good reason and a city living a particular sort of life because of its location and the reasons behind it. As with the planning of the house to which it has been likened, the planning of Oak Ridge has taken into account the special conditions of the site and the special requirements of the inhabitants.

It is planned as a place of good living for people who are depended upon to do good work. Those people are cast not all from one mold. Some are married and want good homes for their families and good schools and playgrounds for their children. Some are single, or living temporarily at Oak Ridge without their families. They want rooms in hotels, clubs, dormitories, or small apartments where congenial friends can live together. They want public eating facilities, movies, bowling alleys, but are not much concerned with schools and playgrounds. Some are young and some are old. Some are scientists and educators, some are storekeepers and clerks, some are builders and repair men. They have different outlooks and different wants and they have different financial and mental resources with which to satisfy those wants.

For that reason the physical facilities that serve the people of Oak Ridge cannot be reduced to a few standard categories designed for the average man and his average likes and dislikes. Residential areas cannot be uniform aggregations of one-, two-, and three-bedroom houses grouped around elementary schools. They must provide as well for people who are living singly and want to be close to the bright lights and the bus lines. Therefore, the neighborhood units that earlier were described as the living rooms of the city are not all alike and are not of uniform composition within each area. One of them, numbered 9 on the "General

Development Plan," is planned entirely for garden-type apartments and dormitories, divided into two large groups to fit the special topography of its site. Neighborhood 3 is planned with a large complement of dormitories, efficiency apartments, and residential hotels in the area around Jackson Square, continuing the wartime use of that area and promising added support to its business facilities when the central business district is established to the west.

In a similar way, apartment areas are located east and west of the proposed Jefferson Center, the west-end counterpart of Jackson Square, and at convenient points in Neighborhoods 10 and 11. Each neighborhood is designed to contain enough family dwelling units to support an elementary school, but many of them include a diversity of accommodations for individuals and for groups that do not contain school-age children.

While the concept of the neighborhood unit implies that the normal day-to-day activities of the family can be carried on within its borders and particularly that small children can satisfy their school and recreational needs there, it is recognized that many family wants can be met only on a more extended or community-wide basis. It has been determined that one senior high school and two junior high schools will adequately serve the entire population. Therefore, the Master Plan contemplates the conversion of the present Senior High School to a junior high to serve the east half of the city and the building of a new senior high school on the northside of the central district to serve the whole community, including many community-wide adult activities of an educational, cultural, and recreational nature. Similarly, sites for churches and clubs are planned in the neighborhoods, at the secondary centers and, for the larger institutions, in the main downtown area as well.

Finally, the downtown area is designed as the social and civic center as well as the business center of the whole community, the place where people from all parts of the city meet. They may meet in the course of shopping expeditions for things the neighborhood stores do not carry, or in a desire to attend the biggest and most glamorous of the city's movies, or to go out for dinner. They may meet to see the municipal Christmas tree or attend a rally, or just because they want to be where the crowds and bright lights are. The downtown area performs an important social and civic function in the life of the community. It welds the people together as citizens of Oak Ridge and gives them a focus for their civic consciousness and pride.

The plan for the central business district of Oak Ridge bears out that thought. It is not a checkerboard of streets bordered by nondescript buildings, with tangled traffic and inadequate sidewalks and no place to park. Instead "Main Street" is planned as a long plaza for pedestrians only, where they need not dodge cars or wait for the light, in order to cross from one side to the other, and where small children need not stay tethered to their elders. Automobiles, buses and trucks will circulate around the outside of the shopping district, where commodious parking lots and service courts will take care of all vehicles transporting people or goods to and from the shops.

The plaza and the surrounding buildings should be planned for beauty as well as convenience, with canopied walks to shield against summer sun and sudden rains. Near its center a connecting plaza opens to the west to serve the AEC offices, city hall, hotel, and other features not coming within the retail shopping category. It is planned that a union terminal will serve all interurban buses. Local buses, in addition to stopping at the same terminal, will loop around the shopping center for the greater convenience of its patrons. In short, the central district deliberately is planned as the hot spot of the city, a place that can be lively and crowded without being congested.

The hospital remains in its present location, both because it has too good a physical plant to discard and because the location is well related to the new center and to the needs of the community. Two areas that are now served with rail facilities and that already contain some warehouses and store yards are designated as light industrial and warehouse areas. They are available for the numerous service industries, the coal and lumber yards, and like facilities that normally serve a community of this size. Here, too, is space for any small manufacturing plants that can be accommodated in Oak Ridge.

In addition to the two main avenues or corridors that were previously described, there are secondary highways that distribute traffic to the various sections of the city and which provide secondary connections between neighborhoods. Insofar as possible these secondary

highways, like the primary ones, run between the residential sections and not through them. However, in the north half of the city the rough topography made full attainment of that ideal impossible and many of the secondary highways are bordered by residential frontage. The highway system is designed to feed traffic into the Oak Ridge Turnpike where it can be handled without adverse effect on the residential sections.

The topography of the Oak Ridge site is so irregular that there are many areas that cannot be built upon with reasonable economy. These remain as open fields or woodlots for casual outdoor play. Fields for organized recreation are provided in connection with the several schools, and a large central playfield is located at the Senior High School.

For more extensive recreation—hiking, picnicking, golf, horseback riding—ample areas exist in the greenbelt that surrounds the developable area of the city. In the simile that likened the city to a house, the greenbelt would be the encircling yards and gardens. The steep north slope of Black Oak Ridge to the north of the city and Pine Ridge and associated rough land at the south form natural greenbelt areas. They provide extensive wooded hillsides that are not suitable for city development and which prevent outside developments from encroaching upon it. At the same time they bring close to the town large areas of natural woodland for outdoor recreation.

At the west end of the city there are drainage and sewerage problems that discourage development beyond the limits shown on the plan, but there is ample area for a golf course and other sports that need open land. Only at the east end of the city is the natural area of greenbelt too narrow for effective protection against the encroachment of outside developments. Here careful regulation of land-use within Oak Ridge will be needed to keep a ribbon development of commercial and miscellaneous facilities from extending out from Oak Ridge into the surrounding country.

EFFECTIVE USE OF THE MASTER PLAN

The purpose of this section is to explain the procedures by which the recommendations of the Master Plan can be carried out and brought into effective use. The various methods of control and regulation that are available for these purposes, their adaptability to present ownership as well as any possible ultimate ownership, and the recommended procedures for establishing the desirable kinds of control are enumerated and described in this section. It will be the responsibility of the authorities who will guide the development of Oak Ridge to determine which of these methods most effectively will carry out the Master Plan. The methods selected not only must properly serve the interests of the A. E. C., but must guide and protect future private interests, and at all times serve the general welfare of the people. Certain means should be employed now, while others will be required at later dates to guide effectively the future development of Oak Ridge.

Under the present single ownership and control of Oak Ridge, all development is under the direct supervision of the A. E. C. If continued ownership and control were contemplated, there would be little need for considering means of carrying out the Plan, other than general recommendations relating to the priority of development and constant surveillance to determine required revisions or adjustments resulting from changing conditions and requirements. The Master Plan would be used by the A. E. C. simply as a guide for the programming of all future physical improvement. No additional regulations or controls would be required.

It is, however, recognized that in all probability Oak Ridge eventually will assume the status of other normal communities in the region. Even though the A. E. C. may have to continue certain of the present controls and subsidies incident to continued efficient operation of the plants, it is expected that the trend will be toward the solution of these problems through normal channels at the earliest possible date. As this change cannot be made immediately, but will progress from present single ownership to limited private ownership and finally to additional private ownership and incorporation, varied means of controls and regulations will be required to safeguard and implement the Master Plan in each specific case and to provide a logical continued procedure for any eventuality.

With the introduction of private development at Oak Ridge, the carrying out of the plan will be similar to that of normal city development which requires the joint effort of both public and private endeavor. The plan will be carried out partly by public agencies who will build the streets, schools, parks, and other public facilities, and adopt regulatory controls for the city development. It will be carried out partly by private action in the construction of residential, commercial, and industrial buildings and the development of new properties under rules and regulations established by public agencies. While the private action is negligible now, it will assume more normal proportions as properties are opened up to private development in the long-range program.

At present the A. E. C. Community Construction Division makes most of the major planning decisions for Oak Ridge. There has been little citizen participation in these decisions. Not only were urgent decisions calling for technical skill required, but the government had no power to delegate this authority. Even though citizens have shown great interest in the city development and operation as manifested by the multiplicity of problems studied by the Town Council, their action necessarily has been confined to an advisory status. The Town Council has no legal status and therefore no power of decision. The A. E. C. under the Atomic Energy Act cannot delegate such power to the Council regardless of whether or not it desires to do so.

However, with the completion of the Master Plan and the recognition that Oak Ridge is to become a normal city, it is recommended that the present planning procedure be modified to include citizen participation. The Master Plan provides the guide that will now enable the people to participate in the planning and building of the city. An effective plan requires active, capable, and constant administration if its objectives are to be achieved. Also it continuously must be kept up to date and revised and adjusted to meet changing conditions. Therefore, the first essential requirement in carrying out the Plan is the formulation of a planning commission, which for the present time will act under agreement with the A. E. C., but which ultimately will operate as a regular and permanent function of local government.

It is recognized that the A. E. C. is concerned primarily with providing good perma-

ment living conditions that will attract and hold efficient personnel for the plants. But being the sole property owner, the A. E. C. is concerned vitally in Oak Ridge also as an investment and the effects that the use of each piece of land will have on the entire city. It is believed that the A. E. C. could be assisted in determining those effects by a citizen's planning commission; also that the objectives of the Plan would be much surer of realization if the people would be allowed to participate in the decisions that determine the planning and building of their city. Not only is the A. E. C. interested in Oak Ridge as a long-term investment, but so are the citizens.

THE PLANNING COMMISSION

This is the organization which is proposed to represent the citizen's interests in all decisions important to the planning and building of Oak Ridge. It will be the single agency whose sole interest will be that of promoting the recommendations of the Master Plan to the best interests of the People, the municipality, and the A. E. C.

In the average city, a planning commission usually is created as a result of the recognition of the need and value of planning by certain civic-minded citizens and officials. Their first objective usually is the preparation of a plan to guide the development of their city. While general public support is desirable during this period of planning, it is not absolutely necessary nor can it be expected. This support is generally lacking because of the absence of understanding. However, ultimately this citizen support and interest must be solicited and obtained if the plan is to be successfully carried out. It usually will be gained through presentation and explanation of the Master Plan itself to the public through the various means of disseminating public information.

At Oak Ridge, the initiative in planning has been taken by the A. E. C. The Master Plan has been prepared under its direction without citizen instigation or participation. However, many of the different phases of the Plan have been reviewed with the various A. E. C. and City Management officials, and have been explained to numerous civic groups, who have shown unusual interest in the plan. It is believed that when the citizens are advised that they might participate in the planning of their city, this interest will be sufficient to require the formation of a planning commission. It is recognized that a planning commission is effective only if the people feel the need for it. But up to this time, there has been an unusually active citizen response at Oak Ridge in all matters of civic interest in which they have been able to participate.

The means of establishing a planning commission, its make-up, duties, and powers are described in the following text.

MEANS OF ESTABLISHING COMMISSION

Under A. E. C. Control

Because federally owned land is exempt from local control, the A. E. C. cannot give up its legal right to make planning decisions nor delegate this authority as long as federal funds are expended on Federal property. Until such time as the A. E. C. sells portions of its property or the city is incorporated, the government will have to control all of the planning and building development at Oak Ridge.

However, in the transitory period from A. E. C. complete control to private ownership and incorporation, when the A. E. C. will be programming and building most of the permanent town and at the same time divesting itself of certain properties through lease or sale, it would appear to be a great advantage to be helped in the furthering of the Master Plan recommendations by citizen participation and aid. This is a most important period in the city's development and one which requires careful and thoughtful use of the Master Plan. An independent point of view would assure the A. E. C. that the plan is used competently for the benefit of the people as well as the government.

This aid could be supplied by the Planning Commission, which could be formed under a

so-called "memorandum of understanding." This is a device sometimes used by government agencies where public cooperation is desired or necessary. It is a document of agreement between the A. E. C. and the Planning Commission, in which both parties set forth their understanding and interpretation of the ways and means whereby they would cooperate for mutual benefit in the carrying out of the Plan. The agreement would be a purely voluntary arrangement and have no legal force. Even though the A. E. C. cannot give up its legal right to make decisions, they might agree to abide by the decisions of the Planning Commission where the interests of the government are not violated and when economies and expenditures dictated by the availability of funds are not controlling factors. If this method of cooperation is used, it will be necessary for the A. E. C. to keep the Commission well informed of budget limitations so that their review of all contemplated land use or changes of land use, proposed construction programs, and public works would be made in this light.

A planning commission formed and operating under this type of agreement with the A. E. C. will need no further authority to proceed with planning procedures. However, looking forward to the time when the A. E. C. sells property to private interests, it well may be set up and constituted as are the legally recognized planning commissions in Tennessee. One great advantage in establishing a planning commission during this period will be that it will begin to function and operate simultaneously with the initial construction of the long-range permanent development in accordance with the Master Plan recommendations. The Commission will become thoroughly familiar with the plan and planning procedures so that they will be in a good position to carry on their work uninterruptedly upon sale of land and eventual incorporation.

Under Limited Private Ownership

As soon as the A. E. C. sells or leases land to private interests, the Planning Commission should be reestablished under the provisions of the Tennessee State Planning Legislation, which provides authority for planning at four levels of government - state, regional, community, and municipality. Since the municipal legislation is applicable to incorporated cities, and the community legislation applies to unincorporated areas not exceeding ten square miles in area, it appears that the Oak Ridge Planning Commission could be formed only under the authority of the State and Regional Planning Act, Chapter 43, of the Public Acts of 1935. This act establishes the State Planning Commission and empowers it to appoint regional planning commissions for any combination of counties or parts of a county, and to define the boundaries of such planning regions. Such a region at Oak Ridge could embrace the present city development and the greenbelt area around the city, or any adjacent additional territory over which planning jurisdiction is desired and feasible. The Commission would be designated as the Oak Ridge Regional Planning Commission. Its powers and functions are detailed in the enabling state and regional legislation.

One advantage of the establishment of the Commission as a regional authority is that if a smaller area is later incorporated in the city of Oak Ridge, the remainder of the planning region would remain under the control and jurisdiction of the Regional Planning Commission.

Under Incorporation

Finally, if Oak Ridge is incorporated, the Planning Commission should be reestablished as a city plan commission operating under the authority of the Municipal Planning Act, Chapter 34 of the Public Acts of 1935, or under such powers as might be granted the City by the State Legislation in connection with the creation of a municipal corporation. Such planning powers are incorporated in a proposed charter for the city, which currently is being considered.

All through these changes, from its inception to reestablishment as a municipal body, the Planning Commission's purpose would be the same, its duties and organization continuous. It could use the same enforcing powers to carry out the plan, or modify them if the situation warranted.

MEMBERSHIP

The Planning Commission should consist of at least five members. In the initial Planning Commission, established under an agreement with the A. E. C., the members might include two A. E. C. representatives and three members designated by the Town Council. In the event a regional planning commission is established, they will be designated by the State Planning Commission. If inaugurated under municipal legislation, the chief executive officer of the municipality will appoint the members. All members of the commission will serve without compensation. Rules for the organization, staff, expenses, and procedures for the two later mentioned types of commissions are detailed in Chapters 43 and 34 of the Public Acts of 1935. If the Commission is established under the regulations of the proposed City Charter, the provisions contained therein would apply.

The Commission should be supplied with funds and assisted in its duties by a paid full-time technical city planning staff, who should be qualified by special training and experience in this particular field. This staff might consist of an executive director or secretary, an assistant planner, and a stenographer. Services of a part-time consultant are also often utilized by such a staff. The size of the staff, however, should be in proportion to the size of the planning job to be done.

DUTIES

The duties of the Planning Commission are to protect and further the recommendations of the Master Plan, to review all proposed new land uses or changes, and to study and interpret the Master Plan in the light of changing conditions in order that adjustments may be made as needed. The Commission also will be charged with the responsibility for determining and administering the methods of control and regulation best adapted to carry out the Master Plan through the various stages of development, beginning with the lease or sale of property by the A. E. C. The Commission necessarily would have to be kept informed at all times of A. E. C. policies and intent regarding disposition of city properties to effectively make these recommendations. The Commission eventually also will assist the city administration also in preparing and adopting long-term improvement programs and budgets for all future developments.

LEGAL POWERS TO ENFORCE THE MASTER PLAN

Perhaps the most important part of the Planning Commission's job will be the determination of the means of enforcing the Master Plan. There are available several legal means from which the Commission may choose. Although it might be desirable to use some of them during the A. E. C. complete ownership and control, it will become absolutely necessary that they be adopted if private investments are to be made in Oak Ridge in accordance with the Master Plan recommendations.

All of the usual legal forms of public control are available for use at Oak Ridge, inasmuch as the Tennessee planning legislation is modern and comprehensive. It provides specific planning controls at all levels of government, including the controls derived from the police powers such as zoning and subdivision control. Other controls such as the building, plumbing, and sanitary codes also are derived from the state police power, but are not a part of the planning legislation. Although these controls are the most effective that are available to the average city today, it should be recognized that they are predicated on the minimums required for the health, welfare, and safety of the community and are restrictive and therefore negative rather than positive in character.

At Oak Ridge, there is also the opportunity, unique in American cities, to utilize other powers which are more creative or productive in nature. The city is owned and controlled by one owner. Upon relinquishment of any part of that control, the A. E. C. may impose restrictions upon the use of each parcel of property or dedicate its use to a specific purpose, so that maximum rather than minimum standards may be required. This may be done by

deed and lease restrictions and land dedication, which along with the usual police powers are described below.

LAND DEDICATION

As long as the A. E. C. retains control of the entire city, it is assumed that streets, schools, parks, and other improvements of a public nature will be located in accordance with the Master Plan, or with any required changes agreed upon by the A. E. C. and the Planning Commission. With incorporation of the city, these locations definitely can be fixed through the dedication by A. E. C. to the city of the land required and recommended for these purposes. Although dedication is not possible unless the recipient is willing, it is inconceivable that the city would reject such an offer. Valuable properties, usually difficult and costly to obtain after a city has been built up, could be acquired at no cost. Not only would the city benefit, but the A. E. C. would be making an invaluable contribution toward the development of Oak Ridge in accordance with the Master Plan. It is an unusual opportunity to accomplish at one time many of the recommendations of the plan.

DEED AND LEASE RESTRICTIONS

Special protective covenants are the principal implements that the large subdivision developer uses to stabilize the value of his investments. Many of the most successful large suburban residential developments in the country have been built and administered under this method, using deed and lease restrictions adopted specifically to regulate the use of each parcel of land. The purchaser of property is assured that the value of his property is protected, as similar restrictions are applied to all other adjoining properties. Both the buyer and the seller who desire protection of values may agree at the time of sale or lease on the way the contracted land may be used best to protect and preserve its physical, social, and economic character. Not only land and building uses may be specified, but the site plan and architectural design of buildings may be controlled. This is usually accomplished by requiring the approval of an architectural board of review prior to building. (See "Architectural Control" in section entitled "City Appearance.") These agreements or special covenants in the contract between two parties are enforceable by court action.

This same principle could be applied to Oak Ridge with several distinctions. The restrictions could be applied to protect the property values of the entire city, not just certain residential sections. Restrictions could be utilized for the general welfare of the entire population. They could be administered by a representative citizen body operating on democratic principles.

Because the government owns the entire city, by the use of special restrictions in deeds and leases, it can make certain that each piece of land leased or sold will be required to conform to the use specified by the Master Plan.

While it is not necessary that they should be, deed or lease restrictions have usually been explicit and inflexible. Applied to residential land where the land use ordinarily does not vary much, rigid restrictions can be long term assets. However, this is not necessarily true of an entire city, where the requirements of land for schools, recreation, business, industry, and other uses may vary from time to time. If the Master Plan could forecast every possible situation for the future of Oak Ridge, rigid building and use restrictions could be applied to all land leased or sold whether for residential use or any other purpose. The Master Plan cannot do this, however, nor does it claim to. It is a general development guide only, and to be used as a guide it must have some flexibility. Therefore, if restrictions are included in deeds and leases they must be made somewhat flexible in most instances in order to make the Master Plan an effective and useful guide. They should include the provision that when the Master Plan is amended after due consideration, the restrictions applying to the property so affected also will be appropriately amended.

There are several ways in which these restrictions may be used at Oak Ridge. In certain instances, where the A. E. C. or the Planning Commission might determine advisable and desirable, they could be used rigidly, without flexibility or the possibility of amendment, definitely to fix the use of certain properties for a given period of time. Since this use of

the restrictions would make permanent certain of the Master Plan recommendations, careful and deliberate consideration should be given to the advisability of this method of control. If it is determined to utilize flexible restrictions, the most logical and enforceable means must be determined. One method would be to include a provision in the deed or lease granting administrative authority and the right to change uses of land to the Planning Commission. Another method would be to include an amending feature in the contract whereby changes in use could be made upon the recommendations of the Planning Commission, subject to agreement by a certain percentage of the property owners within a specific area or distance from the property in question. Another method would be the use of a termination clause in the deed restrictions specifying that the restrictions would terminate upon the adoption of a zoning ordinance, subdivision regulations, and other municipal regulations. In either method, the lease and deed restrictions adopted by the A. E. C. should correspond to the recommendations of the Master Plan and the controls adopted by the Planning Commission to enforce the Master Plan.

It is believed that flexible building and land use covenants are a more effective control than the usual public regulations adopted under the authority of the police power. While public regulations are normally construed as minimum requirements below which the public health and safety will be adversely affected, protective covenants usually exceed these requirements and offer the only means of preserving many amenities of urban development which are not within the scope of the police power. This is not to condemn public regulations as means of control, but rather to point out their principal weakness.

POLICE POWERS

The Constitution of the United States leaves to each state certain police powers including the protection of the health, safety, morals, and general welfare of the people. These powers can be delegated by the state to local public authority. Zoning, subdivision regulations, and building, sanitation, and health codes are all derivations from the state police powers.

In Tennessee, the State and Regional Planning Act of 1935 makes it possible for Oak Ridge, though unincorporated, to form a Planning Commission and enforce zoning and subdivision regulations under the provisions of the County Zoning Act and the Regional Subdivision Control Act.

The building code can be enforced only by an incorporated city. Nevertheless since all of these regulations are used to measure and enforce minimum standards of living and are derived from the police powers of the state, they are described here together.

ZONING

Zoning is one of the legal devices used to implement the Master Plan. It is not a complete device in itself, but is used in conjunction with other means of control. Zoning divides a city into districts corresponding to the intended use of the land. It specifically defines the purpose of each district and explicitly prohibits all uses within the district that do not conform with its purpose. To accomplish this purpose, zoning restricts the location, height, bulk, number of stories, and sizes of buildings and structures. It restricts the density of population and the use of buildings, structures, and spaces. Violation is a misdemeanor.

By applying zoning to the uses of land proposed by the Master Plan, districts are defined in which these uses can be enforced by law. By comparing the "Zoning Map" with the "General Development Plan," it may be seen how the districts exactly conform to the recommended proposed uses of land. The detailed regulations proposed for each of the districts and the method of administration are contained in the Zoning Resolution of the Oak Ridge, Tennessee Planning Region, which is included in the Appendix of this report. The zoning regulations may be used in this form or as a basis for guiding the preparation of the final ordinance, whether simplified or comprehensive, or whether for use by the A. E. C., a regional planning commission, or a city planning commission.

Another means of enforcing the Master Plan is simplified zoning used in combination with explicit deed restrictions administered by the Planning Commission. Such an ordinance

would prescribe only the general provisions governing building and land use construction in each zoning district. The details could be administered by the Planning Commission through flexible deed restrictions on building construction and land use.

SUBDIVISION REGULATIONS

The control of land subdivision and development is another of the means of carrying out the Master Plan. It is the means by which private land development can be brought into conformity with the Master Plan and the best public interest.

These regulations establish minimum standards of design and construction for all new land development, including both private and public improvements. They provide the guide by which the Planning Commission equally and fairly may appraise all proposed plats for subdivision. They also provide the prospective land developer with a guide to the prerequisites of land subdivision that will meet the approval of the Planning Commission.

These controls are necessary if orderly and economical development is to be achieved. Through the use of such regulations the design and quality of subdivisions will be improved, resulting in better living conditions and greater stability of property values for the individual property owner. These controls also will insure the installation of utilities that economically may be serviced and maintained, a coordinated street system of adequate but not excessive width, and adequate open spaces for recreation and other public services.

In Tennessee, the exercise of subdivision control by a regional planning commission is conditional upon the adoption of a regional plan or at least a major road plan. The "Thoroughfare System Map" included in this report as part of the Master Plan will serve this purpose. Upon filing a copy of this plan in the office of the County Register of Anderson County, the Planning Commission properly may proceed with the review of all proposed plats for new development. Plan Commission approval is a prerequisite to the filing for record of any subdivision plat. Violation of this procedure is a misdemeanor.

The detailed procedure for platting and the general requirements and minimum standards of design are contained in the proposed "Subdivision Regulations, Oak Ridge, Tennessee, Planning Region" included in the Appendix of this report.

BUILDING CODE

The building code is a set of minimum standards, the purpose of which is to protect people in and about buildings. In contrast to zoning, which divides the community into districts with different regulations for each district, the building code is uniform in character and is applied to the community as a whole. The same is true of the other municipal codes such as plumbing and electrical codes, all of which are concerned with the public health, safety, and general welfare of the people. While the codes are not derived from the Master Plan as are the zoning and subdivision regulations, they are created to serve the people in the same way as the Master Plan.

The building code sets forth the minimum requirements for structural strength and stability, sanitation, means of egress, adequate light, ventilation, and safety to life and property from fire and hazards incident to the design, construction, or alteration of buildings and structures. The code also creates a system of supervision making permits and inspections by a public official mandatory. Violation is subject to fine and halt of the work.

Oak Ridge, being a new city with relatively little permanent construction, may apply the zoning and subdivision regulations to the uses proposed in the Master Plan with very few discrepancies. The same is true of the building code and other codes which could be enforced without significant exception if adopted at an early date. Used together these regulations will enforce the minimum standards of the Master Plan. They state the minimum requirements for what is to be built, where it is to be built, and how it is to be built.

OTHER MEANS OF CARRYING OUT THE MASTER PLAN

The governmental controls and actions necessary to protect and further the recommendations of the Master Plan have been enumerated and described above. Under complete own-

ership, the A. E. C. may accomplish many of the recommendations of the plan through the use of these controls alone. However, with incorporation of the city, when public improvement will be paid for by taxation, full realization of many of the plan recommendations will require the understanding and support of the public. Even though the controls may be wisely and carefully legislated, the administration of many of them will require the cooperation of the public for satisfactory results.

The importance of gaining public support for any planning program cannot be overemphasized. The degree of the success of planning accomplishments will be dependent largely on the degree of interest and support given the plan by the public. To be interested, the public first must understand the plan. They must understand the reasons and needs for proposed improvements. They must understand their value in order to approve the expenditure of public funds for these purposes.

There are various ways in which the public may be kept informed and their understanding and support solicited. An active and able planning commission acting in close cooperation with the A. E. C. and the city officials, and utilizing the usual methods of popular education, alone may be able to effectively provide the public with the planning information necessary for such support. However, the commission may feel the need for and enlist the aid of a group of interested citizens to help establish closer relationships with the public and to stimulate planning interest. Such groups usually are established as citizens planning advisory boards. They are made up of citizens who are interested sufficiently in the welfare of the city to thoroughly acquaint themselves with the plan and its purposes so that they may aid the Planning Commission in sponsoring public education and backing for the Plan. The organization may include as many citizens as are actively interested, but should include representatives of all sections or groups in the city.

The methods that may be used by the Planning Commission or the Citizens Advisory Board to keep the public informed of planning objectives, activities, and accomplishments are generally the same as used for any other endeavor. These include the use of newspapers, the radio, Master Plan reports, annual Planning Commission reports, and addresses or lectures to various civic groups and organizations. In addition, the incorporation of planning education in the public school curriculums is one of the most effective ways in which public support for the long-range success of planning may be developed.

Most of the above described means of acquiring public support for the Master Plan pertain to those planning projects which are carried out through governmental action as public improvements involving the use of public funds. It must be recognized that there are other recommendations of the plan which will be carried out through non-governmental action as private developments. They, too, should be carried out in conformity with the plan in ways that will maintain community pride and contribute to the general welfare. Some of the means that may be utilized to stimulate a desire on the part of individuals to develop and use their properties in this way may be sponsored by neighborhood improvement associations or other similar civic organizations, whose sole purpose is the betterment of the community.

LONG-RANGE FINANCIAL PROGRAM

The Oak Ridge Master Plan is a long-range program for the physical development of the city, the accomplishment of which will cover a period of years. Some of these developments will be required immediately. Others may not be needed for some time and may be developed gradually in proper relation to the other elements of the program. In the selection and scheduling of public improvements it will be necessary to consider both the urgency of the different elements of the plan and the financial ability of the controlling agency, whether the A. E. C. or the municipality, to pay the cost. The relative importance of all factors involved must be appraised carefully so that properly balanced construction programs may be inaugurated and carried out in accordance with the long-term purposes of the Plan.

This will require a long-term financial program by which to carry out the long-term physical developments. The funds available for physical improvements must be utilized where and when they will serve the best purpose over the greatest period of time. Although

the purpose and the time of construction will be determined by the Master Plan, they both will be controlled by the long-term financial program. Experience in many cities has proven the value of a long-term budgeting of public improvements based on a long-range city plan. This procedure has come to be an accepted municipal practice.

A long-range financial program is made up of a complete list of improvements which are needed and required by the city over a given period of time, and for which it is anticipated funds will be available. Improvements will be listed in order of their urgency, along with estimates of cost and methods of financing. While budgets are usually provided and adopted only for improvements of the current year, the long-term forecast will provide additional evidence upon which to wisely base each current budget.

The formulation of such programs is usually a function of city government. At Oak Ridge, until incorporation, it will be an A. E. C. administrative function. But in either instance, it is a procedure in which the Planning Commission might well assist. Regardless of who develops the city, the purpose and timing of the physical development will be the same.

DETAILS OF THE MASTER PLAN

POPULATION

Since Oak Ridge has been established so recently, and the number of families has of necessity been controlled by A.E.C. policy and the limited availability of housing accommodations, studies of the past rate of growth or decline will be of no value in determining the future population to be planned for at Oak Ridge.

An analysis of the present population, however, will be valuable in determining the requirements of the future population. The kind of accommodations for the future population, whether for families or single workers, the type of family unit, whether single house or multi-family units, the size of units, whether one, two or more bedrooms, the percentage of white and negro units, the cost of units in relation to income, etc. must be predicated on an analysis of the present population and any known or foreseeable characteristics of the future population.

An analysis of the present population also will disclose the age groups for which cultural and recreational facilities must be provided, such as schools, playgrounds, and other neighborhood and community facilities.

PRESENT POPULATION

Since Oak Ridge was established after the last United States Census of 1940, and no local comprehensive census has ever been undertaken, the most authoritative figure for the total existing population is one derived from the figures issued by the A.E.C. City Management Control Section and Statistics Branch - 35,607 persons as of November 30, 1947. For a tabulation showing the derivation of this figure see Appendix No. 1.

The relationship of the worker population living at Oak Ridge to the total workers employed, is best shown in the table below, which was contained in a "Proposed Housing Program" — Report by the Manager of Oak Ridge Operations — February 3, 1948.

Contractor	Total no. workers	No. workers housed on area			Per cent of workers housed on area		
		Family	Single	Total	Family	Single	Total
PLANT							
Operations and Research	10,159	5,902	1,049	6,951	58	10	68
Design and Construction	<u>1,472</u>	<u>386</u>	<u>128</u>	<u>514</u>	<u>26</u>	<u>9</u>	<u>35</u>
Total	11,631	6,288	1,177	7,465	53	10	63
GOVERNMENT							
A.E.C.	2,110	1,163	256	1,419	55	12	67
Other Agency	<u>90</u>	<u>67</u>	<u>13</u>	<u>80</u>	<u>74</u>	<u>15</u>	<u>89</u>
Total	2,200	1,230	269	1,499	56	12	68
CITY							
Service Design and Construction	4,944	1,764	555	2,319	36	11	47
Concessionaires and Licensees	<u>586</u>	<u>131</u>	<u>50</u>	<u>181</u>	<u>22</u>	<u>9</u>	<u>31</u>
Total	1,998	844	1,003	1,847	42	50	97
	<u>7,528</u>	<u>2,739</u>	<u>1,608</u>	<u>4,347</u>	<u>36</u>	<u>21</u>	<u>57</u>
GRAND TOTAL	21,359	10,257	3,054	13,311	48	14	62

This table discloses that out of a total of 21,359 workers, 62 per cent are housed at Oak Ridge, which is abnormally low due to the present unavailability of housing. Forty-eight per

cent are married or family workers and 14 per cent are single workers. Of the 13,311 workers housed at Oak Ridge, 77 per cent are married workers and 23 per cent single workers. Among urban families in the United States in 1941, the ratios were 82.9 per cent married, and 17.1 per cent single.

Also disclosed is the present ratio of two production workers, including Government employees, to one service worker in the city. The normal urban ratio is just the reverse or closer to one and a half or two service workers for each production worker.

PRESENT COMPOSITION OF POPULATION

Age Groups

Data prepared by the Oak Ridge Department of Health and illustrated in Appendix No. 2 show that the population of the city is startlingly younger than that of the average city. There is a predominance of adults in their 20's and early 30's, and a lower than normal percentage of adults over 45. Especially high percentages are to be noted in the age group from one to five years of age and in the female population group from 20 to 24 years of age.

A recent survey disclosed that approximately 32 per cent of the male adults in Oak Ridge, compared with 14 per cent for the United States, are below 30 years of age. Below the age of 35, the figures are 55 per cent and 26 per cent for Oak Ridge and the United States respectively; and below the age of 45, 81 and 51 per cent respectively.

School Age Group

A comparison of the population of children in the various age groups in Oak Ridge in 1948 and the United States in 1947, as shown in the table below, shows that 39 per cent of the Oak Ridge population in 1948 was less than 20 years old, while the comparable figure for the United States in 1947 was 33 per cent.

	Oak Ridge (Per cent)	U.S. - Urban (Per cent)
Under 5 years	17.4	10.2
5 to 9 years	10.6	8.4
10 to 14 years	5.8	7.2
15 to 19 years	5.6	7.8
Total 0 to 19 years	39.4	33.6

Size of Family

The present average family size is 3.34 persons. For white families the figure is 3.33 and for negroes, 3.69. The U.S. Census figures for persons per occupied dwelling unit is 3.78 for the year 1940 and 3.63 for April 1947.

Workers Per Family

There is a relatively high ratio of extra workers in Oak Ridge families. A factor of 1.08 workers per family was derived from a report issued July 1, 1947 by the Carbide and Carbon Chemicals Corporation. A more recent comprehensive survey discloses that there are 1.18 workers per white family and 1.46 workers in negro families. In over six hundred white families, wives are employed and there is a relatively low percentage of part-time workers.

Workers Incomes

The average 1948 income of all workers at Oak Ridge is \$3,153.00. For white workers the average is \$3,179.00 and for negro workers \$2,024.00.

Negro Population

Of the present total population of 35,607, it is estimated that there is a negro family population of 812 persons and a negro single population of 409 persons, or a total negro population of 1,221. This is 3.43 per cent of the total population.

FUTURE POPULATION

The estimate of the ultimate maximum population of Oak Ridge is based on the number of dwelling units of the required types that could be built on the land available for city development at reasonable standards of density. This involved a study of the physical limitations of the site and of the areas capable of being developed.

After determining the land areas which were topographically suitable for development and which could be economically serviced by utilities within the present physical limits of the site, the following factors and principles of design were utilized to determine the total population which could be met within the physical limitations of the total Oak Ridge site.

(1) The neighborhood principle of design in which the population of each neighborhood generally is based upon the desired maximum size of an elementary school of 500 pupils, utilizing the factor of .446 elementary school children per family, a figure established in the study of future school requirements. (See "Schools" page 44)

(2) The determination of desirable percentages of different types of housing accommodations—single-family, two-family, and multi-family, and the land areas required to build the various type of units at desirable densities on topography best suited to their construction as more fully described in the "Housing" section of this report.

(3) The land area requirements for schools, recreation, business, industry service and maintenance, administration, and streets for each neighborhood and for the community in general.

This method disclosed that a properly planned and integrated city development of 13 neighborhoods, containing approximately 12,500 family units and 2,800 single-person units could be accommodated on the buildable area within the physical limits of the city at desirable densities.

Expansion of the city beyond these planned limits is either impossible or inadvisable because of the physical barriers on the north and south, the political boundary of the County line on the west, and the reservation limits on the east, and the doubtful economic extension of the present utility systems beyond these limits. Therefore, any future additional required population should be established in complete new satellite town developments in one of the adjoining valleys.

The distribution of the ultimate population as shown on the "General Development Plan," resulting in an average size neighborhood of 3,600, is summarized in the table below:

Neighborhood	Existing permanent units		New units		Total units	Population @ 3.78 persons per family
	Single and two-family	Multi-family	Single and two-family	Multi-family		
1	305		610	50	965	3,648
2	856	212			1,068	4,037
3	539	137	135		811	3,065
4	736	364			1,100	4,158
5	134	380	428		942	3,561
6			550	300	850	3,213
7			760	200	960	3,629
8			902	59	961	3,633
9				900	900	3,402
10			850	390	1,240	4,687
11			650	300	950	3,591
12			855	60	915	3,458
13			670	130	800	3,024
Sub-total	2,570	1,093	6,410	2,389	12,462	47,106
Plus single white dormitory spaces (Jackson Square)						1,457
Plus single white dormitory spaces (Neighborhood 9)						1,000
Plus single negro dormitory spaces (Neighborhood 10)						400
TOTAL						49,963

ADDITIONAL FACTORS USED IN ESTIMATED TOTAL POPULATION

The total population of 50,000 as determined above was checked with the following factors:

The total family population was derived by applying the national family average of 3.78 to the number of family units (12,462) estimated as the maximum that can be accommodated on the site. Although the present family size is 3.34, almost one-fourth of the families are comprised of young married couples with the wife under 35 years of age, or a figure comparable to that for all couples in the U.S. Also, approximately 35 per cent may be classified as "founding families," in which all children are under 8 years of age and the majority were under 5 years of age; 25 per cent may be classed as "expanding families," having some children 8 to 18; while only 15 per cent are families with the wife over 35 and all children, if any, over 18. On this basis, it was concluded that the size of Oak Ridge families would increase over a period of years in the future in the direction of the national pattern.

The total single workers to be housed (2,857) represents a decrease from the present 3,054 single workers presently housed, in anticipation of future conformance to U.S. urban averages mentioned earlier.

For a breakdown into estimated totals for the negro and white populations, utilizing 50,000 as the ultimate population, the estimated percentage of future negro population (10 per cent) was applied. Although the present negro population is only 3.43 per cent of the total, this ratio is expected to increase to that nearer the East Tennessee urban ratio along with the building of permanent standard housing and increased employment opportunities. The 1940 negro population of Knoxville, Tennessee, was 14.4 per cent of the total, and for Johnson City, Tennessee, 10.6 per cent.

Negro Population

10 per cent of 2,857 total single workers - 286 negro single workers.*
10 per cent of 47,106 total family population - 4,711 negro family population.

White Population

90 per cent of 2,857 total single workers - 2,571 white single workers.
90 per cent of 47,106 total family population - 42,395 white family population.

Number of Workers

The maximum number of 12,462 family units and 2,857 single units, comprising the ultimate city development, will house 16,315 total workers, which figure was estimated as follows:

1. Since some families contain more than one worker, the factor of 1.08 worker per family was applied to the number of family units, 12,462, resulting in 13,458 workers. (The later survey figure of 1.18 was not used as it was thought this figure was higher chiefly because of the existing high percentage of young childless couples, which percentage would tend to decrease in the future.)

2. By adding the anticipated 2,857 single workers to the 13,458 family workers, a total of 16,315 total workers was derived.

Oak Ridge now houses 13,311 workers of which 10,257 (77 per cent) are married and 3,054 (23 per cent) are single. In estimating future population on the basis of 16,315 workers housed, it is assumed that the proportion of married workers will more nearly approach U.S. urban averages. It is estimated, therefore, that the 16,315 workers will represent 13,458 (82 per cent) married workers and 2,857 (18 per cent) single workers.

The A.E.C. made a forecast, from the best available sources at the time, of the number of workers that would be required to operate the plants in 1955. These figures were con-

* It is anticipated that the number of negro single workers will be temporarily increased during the construction period.

tained in the "Proposed Housing Program" - Report by the Manager of Oak Ridge Operations - February 3, 1948 as follows:

<u>Contractor</u>	<u>Total Number of Workers</u>
PLANT	
Operation and Research	9,800
Design and Construction	1,000
Total	10,800
GOVERNMENT	
A.E.C.	2,100
Other Agency	100
Total	2,200
CITY	
Service	4,500
Design and Construction	500
Concessionaires and Licensees	3,000
Total	8,000
GRAND TOTAL	21,000

In comparison with the table showing the number of workers as of September 30, 1947, it will be noted that the total number of workers remains approximately the same, as does the proportion of production workers to service workers. On the basis of this estimate, Oak Ridge, if fully developed, could house 77 per cent of its workers.

However, the figure of 8,000 service workers included in the above estimate is far below the normal urban ratio of one and one-half or two service workers to one production worker. As commercial facilities are expanded and Oak Ridge more nearly approaches a normal city it seems probable that a ratio of at least one service worker to one production worker may be anticipated. On this basis, a total of 13,000 service workers and a combined total of 26,000 service and production workers would be employed at Oak Ridge, of which only 60 per cent could be housed. The A.E.C. will be required to determine the distribution of available housing between service and production workers as necessary for the continued successful operation of the plants.

HOUSING

PRESENT HOUSING

The present family residential development, excluding the hutments and the few private trailers, consists of 9,125 dwelling units varying in types of construction and degrees of permanence from the Cemesto type to the Victory Cottage (VC-1) type, 113 efficiency apartment units of permanent construction, and 122 converted dormitory apartments, or a total of 9,360 accommodations, all of which are occupied, excepting the normal percentage of vacancies occasioned by employment turn-over and consequent moving operations. There are 151 hutments and fifty privately-owned trailers occupied as family quarters in Oak Ridge and forty-nine occupied farmhouses in the area. In addition, there are approximately 2,400 persons living in eighteen of the original ninety dormitory buildings which at one time housed approximately 13,000 persons. The balance of the dormitories are in stand-by status for possible emergency or construction worker use, or have been converted to other uses or have been sold and demolished.

The family dwelling types, with the exception of the hutments, private trailers, and a greater part of the VC-1's, are located on the hillside and ridge area north of Oak Ridge Turnpike in typical residential developments, while the apartments and dormitories are located in the more level areas near the Turnpike in three general locations — near Jackson Square, in East Village, and in the area west of Illinois Avenue.

The present density of land use, or the number of families housed per acre for the various types of housing, varies from approximately 3.5 families per acre for most of the Cemesto types to about 8.6 for the K, L, and N types of multi-family housing. The majority of the temporary housing, including the T.V.A., T.D.U., T, U, S, and V types, averages about 5.0 families per acre.

The type and size of the 9,360 existing family dwelling units are summarized in the following table:

Type and Size of 9,360 Existing Units

Type of Unit	No.	Per Cent	Size of Unit	No.	Per Cent
Single-Family	5,815	62	1-Bedroom	2,440	26
Two-Family	2,226	24	2-Bedroom	5,110	55
Multi-Family	1,319	14	3-Bedroom	1,810	19
Total	9,360	100		9,360	100

While the percentages of the different types of unit vary from locality to locality, depending on local personal owner and builder preferences, the national urban pattern indicates that the Oak Ridge distribution of single-family units is average, but that it is higher than average for two-family units and lower than average for multi-family units. It is recognized, however, that the percentages to be utilized for the future composition of Oak Ridge units will depend not only on personal preference, but upon topographic conditions, desirable land density uses, building costs, rent-paying abilities of the population, and other factors, which all have been considered in the proposed future housing program.

The national urban pattern for the size of units should not be considered a guide for Oak Ridge, as most housing surveys today indicate a shortage of three- and four-bedroom units in relation to the need. It is fairly obvious at Oak Ridge that too great a percentage of one- and two-bedroom units have been built, and that the future program should include a greater percentage of three-bedroom units and the required number of four-bedroom units.

The following table shows the distribution by type and size of the 3,663 units that have been classified as permanent:

Type and Size of 3,663 Permanent Units

Type of Unit	No.	Per Cent	Size of Unit	No.	Per Cent
Single-Family	2,450	67	1-Bedroom	691	19
Two-Family	120	3	2-Bedroom	2,002	55
Multi-Family	1,093	30	3-Bedroom	970	26
Totals	3,663	100		3,663	100

FUTURE HOUSING

Having determined that 50,000 people ultimately are to be housed at Oak Ridge, and certain facts about them, it then was planned how and where they should be housed.

From the analysis made of existing units, it was determined what present facilities may be utilized in the permanent program and how many temporary or obsolete units eventually must be replaced. An analysis of the future population has determined the number of new units that will be required. It was decided then what areas were available for new development and to what type of development they were best adapted.

Once the number of units and areas available for such development was determined, the overall density was obtained. Within these limits, the size, type, and density of residential development vary in accordance with family requirements and desirable planning standards.

The description of the future housing program which follows details the above procedure.

Analysis of Existing Units

From the Phase "B" Master Plan survey, "Analysis and Report of Existing Facilities," it was determined that only thirty-one per cent of the total occupied units, including dormitory and family units, were considered to be permanent. Fourteen per cent were considered semi-permanent, while forty-nine per cent were classed as temporary, and six per cent as sub-standard. This analysis indicates that over one-half of the current housing supply requires demolition, replacement, or alteration and renovation for extended temporary use. This permanent construction program must be scheduled so that sufficient facilities will be maintained in service at all times.

The existing permanent units, comprising 3,663 dwellings are in Neighborhoods 2, 3, and 4, which will remain as they are with the exception of the removal of the few temporary units. These units were placed in these neighborhoods during the later housing programs on terrain unsuitable for permanent units, and at densities and spacings considered undesirable for permanent development. The semi-permanent dormitory units, are of the H-type located in the Jackson Square Area and in Neighborhoods 6 and 7 along Oak Ridge Turnpike. These family and dormitory units comprise the nucleus of the permanent housing program of the city.

The remainder of the city residential and dormitory development in Neighborhoods 1, 5, 6, 7, and 8 comprising 4,957 family units and the S-type dormitories were determined to be of a temporary nature. Because of their physical condition and the wartime construction and standards of design utilized, these buildings should be replaced. If it is decided to extend their useful physical life until maintenance becomes excessive, repairs or alterations of varying degrees must be made.

The hutments and the 740 Victory Cottages located for the most part in the areas south of the Turnpike were classed as sub-standard or obsolete and should be removed at the earliest possible date.

In summary, the total new permanent housing program for a 50,000 ultimate population will require 8,797 new units, of which 5,696 units will be replacements of existing units.

The abandonment of sites now occupied by temporary units but unsuitable for permanent units and the additional space required for the spacing of permanent units will reduce the number of families in the area north of the Turnpike from 9,000 to about 7,500. New areas, therefore, have been allocated to accommodate these 1,500 families as well as any new families to be housed.

NEW AREAS AVAILABLE FOR DEVELOPMENT

The new areas which are available and suitable for development are all south of the Turnpike with the exception of the area in Neighborhood 8 at the west edge of the City. These new areas include: (1) Neighborhood 9, the area south of the Turnpike and west of Illinois Avenue, where 453 permanent apartments are now being built and where additional vacant land is available; (2) Neighborhood 10, the former Gamble Valley Trailer Camp area, from which all trailers have been removed and where certain utility installations may be reutilized (In accordance with local custom and practice, equal facilities have been provided for negroes in this neighborhood); and (3) Neighborhoods 11, 12, and 13, now occupied by hutments and scattered service and maintenance facilities which should be removed and consolidated into areas planned for this particular use.

AREAS SUITABLE FOR DIFFERENT TYPES OF DEVELOPMENT

Although it is desirable to include all types of building unit in each neighborhood, the topography of the site is a primary factor in the location of the various types of unit. The development of multi-family units, especially the large apartment and row house type, is best suited to level or gently rolling terrain. Therefore, the largest part of the multi-family units will be located in the more level areas in Neighborhoods 6, 7, and 8 adjacent to and north of the Turnpike, and in the relatively level areas of Neighborhoods 9 and 11, adjacent to the main business center.

The remainder of the buildable city area, the steep side hill areas in the north of the city, and the rolling areas on the south are best suited to single- and two-family house type of development.

TYPES AND SIZES OF UNIT

Types

The proportion of family and single worker units to be planned for the ultimate population already has been determined. The proper proportion of the type of units to be provided within this framework was next decided.

The proportion of dormitory or apartment units to be provided for single workers will depend chiefly on personal desires and income. Not all of these workers will want dormitory rooms. Those within the higher income brackets, or approximately 10 per cent of this group, can afford and probably will want apartment or hotel accommodations. Others probably will want to share apartments or live with some family. It is estimated that out of the total of 2,625 single workers to be housed, at least 260 will want apartment units.

There are several factors to be considered in estimating a desirable composition of one-family, two-family, and multi-family units for the ultimate city. Family size is one factor, although it is more important in determining sizes of unit than types. Family preference is another. Most families with several children prefer individual homes with plenty of yard space. Families with one or two children probably will want houses, although a certain percentage may choose the multi-family type of unit because of the reduction in individual maintenance, and for economic reasons. Young couples and older couples with no children usually prefer apartments. Family income and rent paying ability also must be considered in the formulation of a building program. Other factors are the topography, which restricts the building of multi-family units to the level land, and building costs which also dictate the use of such land for such units. Although all of these factors must be considered, the actual percentage of types of housing to be programmed either for the A.E.C. or private builders will be determined principally by the economics of building. The percentages determined by a study of all of the factors involved are 60 per cent one-family dwellings, 12 per cent two-family dwellings, and 28 per cent multi-family dwellings. These percentages may be utilized to attain a desirable overall density of development at Oak Ridge.

Sizes

The size of the units to be included in the above-determined distribution of type of units was next studied. The most important factor is the size of the family, with family income and preference following in order of importance.

Using the analysis of the types of families at Oak Ridge, including the age and sex of all family members, from the survey, "Analysis of Housing Need in Oak Ridge," August 1948, a determination was made of the numbers of bedrooms required to meet the needs of the existing families. On this basis 30.2 per cent of the married white workers require one-bedroom units; 39.3 per cent, two-bedroom units; 24.4 per cent, three-bedroom units; and 6.1 per cent, four-bedrooms. The percentages for the married negro workers are 24.6 per cent, one-bedroom units; 38.9 per cent, two-bedroom units; 24.6 per cent, three-bedroom units; and 11.9 per cent four-bedroom units.

The distribution of bedroom requirements among the various income classes also served as a basis for determining the distribution of future housing requirements. Before arriving at this distribution, however, it was necessary to make two adjustments to the above figures. The first was made for the estimated change in the nature of the city's future population, whereby the family size would increase over a period of years. It was estimated that approximately 5 per cent of the white families now requiring one bedroom eventually would require two bedrooms. Also, that 10 per cent and 5 per cent of the groups now requiring two and three bedrooms respectively would require one additional bedroom. No adjustment was made for the negro population as the structure of this population appeared to be nearer normal. The second adjustment was made among the families in the various income groups to recognize their housing preferences. While most white families in the higher income groups requiring only one or two bedrooms will desire extra bedrooms, white families in the lower income groups will be forced by economic reasons to occupy smaller units than they require unless subsidized housing is provided. Since there were no negroes in the high-income groups, the only adjustment made was that from larger to smaller units in the lower-income group for economic reasons.

The results of this analysis is a bedroom requirement as follows:

Size of Unit	Percentage of Total Units	
	White Families	Negro Families
1-Bedroom	14	24
2-Bedroom	39	52
3-Bedroom	36	20
4-Bedroom	11	4
Totals	100	100

ULTIMATE HOUSING PROGRAM

The application of the above-determined percentages of type and size of unit to the total family requirements of the ultimate population is shown in the following tables:

Type of Family Dwelling Units for 50,000 Population

Type	Existing		Proposed		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Single-Family	2,450	19.6	5,033	40.4	7,483	60
Two-Family	120	1.0	1,377	11.0	1,497	12
Multi-Family	1,093	8.8	2,399	19.2	3,492	28
Totals	3,663	29.4	8,809	70.6	12,472	100

Note: The existing units shown in this and the following table represent the 3,050 Cemente units, 500 K, L, and N Units, and 113 A-1, A-2, and A-3 Efficiency Apartments classified as permanent units.

Size of Family Dwelling Units for 50,000 Population

Size of Unit	White Families		Negro Families		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Existing Permanent Units						
1-Bedroom	691	19	—	—	691	19
2-Bedroom	2,002	55	—	—	2,002	55
3-Bedroom	970	26	—	—	970	26
4-Bedroom	—	—	—	—	—	—
Totals	3,663	100			3,663	100
Proposed Permanent Units						
1-Bedroom	880	12	300	24	1,180	13
2-Bedroom	2,375	31	650	52	3,025	34
3-Bedroom	3,070	41	250	20	3,320	38
4-Bedroom	1,234	16	50	4	1,284	15
Totals	7,559	100	1,250	100	8,809	100
Total Permanent Housing Program						
1-Bedroom	1,571	14	300	24	1,871	15
2-Bedroom	4,377	39	650	52	5,027	40
3-Bedroom	4,040	36	250	20	4,290	35
4-Bedroom	1,234	11	50	4	1,284	10
Totals	11,222	100	1,250	100	12,472	100

Note: The proposed units in the above tables include the 453 garden-type permanent units now being built in Neighborhood 9, and the 1,047 units presently scheduled for Neighborhoods 10 and 11.

The above tables indicate that while numerically an excess of any one type or size of unit has not been built, the composition of the future housing programs should be changed since a disproportionately high number of small units has been built. The future programs should include more three- and four-bedroom units.

LOCATION

The "General Development Plan" shows the location of the types of housing recommended for the various neighborhoods of the city. The single- and two-family dwelling units are the largest land use in all neighborhoods, with the exception of Neighborhood 9. Some multi-family units are located near the center of several of the neighborhoods, including the existing permanent units to be retained and new units of row or group houses and apartment types. Larger concentrations of multi-family units are located in Neighborhoods 9 and 11, adjacent to the main center of the city where experience has indicated tenants of this type of housing want to live. Also, in the more level areas close to the Turnpike where it is most economical to construct this type of building.

It is planned that the major part of the single population ultimately will be accommodated in buildings of the dormitory or efficiency apartment type in the present Jackson Square Dormitory area between Tennyson Road and Georgia Avenue, and in the east part of Neighborhood 9. Both locations are adjacent to major shopping and recreation facilities. Accommodations for all types of workers also have been located in Neighborhood 10 for the negro population.

GENERAL PRIORITY OF CONSTRUCTION

Since only 3,663 dwelling units of the total units are classified as permanent and the re-

mainder of the units have an estimated short-term physical life, in order to maintain the present population in housing of good quality, new housing must be erected at an early date to replace temporary units as they deteriorate.

Replacement of the temporary units with permanent units in the area north of Oak Ridge Turnpike will result in a decrease in the total number of accommodations there because of the additional space required for the spacing of permanent units. Further temporary decreases in this area may be anticipated during the replacement construction program by the removal of the temporary units from service. Therefore, to house the present population, a certain amount of new housing must be provided in new areas before any replacements can be made.

Development was planned accordingly for 453 garden-type apartments which now are being constructed in Neighborhood 9, in an area formerly occupied by S-type dormitories that were no longer being used or required for future use. New family housing also is being constructed and scheduled in new Neighborhoods 10 and 11 to accommodate 1,047 families. These programs will somewhat alleviate the immediate housing shortage and will permit the initial rehousing of families displaced by the removal of temporary and sub-standard units prior to new permanent construction in those areas. Later programs also must schedule housing replacement to maintain the proper proportion of the various type and size of units in service during the construction period.

Inasmuch as it is sound economy to complete the development of an entire neighborhood, the next phase of the program should include the completion of Neighborhood 11. Since the south portion of this area presently is occupied by the hutment area for negroes, for whom housing accommodations are to be provided in the preceding program, this area may be cleared and made available for development of the remaining units needed to complete the neighborhood. When required, the next most logical development would be in Neighborhood 12, where an entire neighborhood of approximately 900 units could be built.

Following these developments, additional new housing may be provided in the remainder of Neighborhoods 8 and 9, and also in Neighborhood 10 for the amount of housing required at that time. The last new neighborhood to be scheduled, Neighborhood 13, would not need to be developed until the foregoing developments had been completed, and until the replacement program north of Oak Ridge Turnpike had been programmed and undertaken. In any event, this neighborhood would be the last one to be developed.

While the above general program is recommended, it is recognized that conditions at Oak Ridge will be changing constantly within the next few years. It will be necessary to review the factors upon which these conclusions were based at regular intervals before specific housing programs are determined. A more detailed analysis of the future housing program is contained in the report, "Analysis of Housing Need in Oak Ridge,"—August 1948.

SCHOOLS

A maximum size elementary school of 500 pupils has been used as a basis for determining the size and population of the proposed neighborhoods, based on a recommendation by the local schools authorities and approved by the Board of Consultants for the Master Plan.

Having accepted the elementary school as the dominant factor in the establishment of the neighborhood, the schools have been so located and designed that they will properly serve as the center of all neighborhood social and cultural activities.

The elementary schools have been located primarily for the convenience of children, for safety, and accessibility. They are within walking distance, wherever possible, for all children in the neighborhood, or within one-half mile distance of every dwelling. Also, wherever possible, they have been located so they may be reached readily without crossing major flows of traffic and in a central location in each neighborhood.

School sites of sufficient area have been provided for suitable settings for the buildings, adequate playground spaces, and additional areas for the neighborhood park facilities, so that the area will serve as the recreational center of the entire neighborhood. The school buildings should be well-designed in an attractively landscaped area in order that they will set the pattern for attractive neighborhoods.

The junior high schools have been located to serve the children of the surrounding neighborhoods. Adequate area has been provided for a greater variety of active recreational facilities than at the neighborhood elementary school center.

The senior high school with its accompanying gymnasium and auditorium facilities has been located near the geographic center of the city to serve the needs of the entire high school population. The auditorium and gymnasium located there also will serve educational, cultural, and social requirements of the adult population. Ample area has been provided for the usual active recreational facilities of a playfield plus that required for athletic fields, bleachers, and ample parking space.

EXISTING SCHOOL FACILITIES

Elementary Schools

The elementary school system at Oak Ridge includes kindergarten and the first six elementary grades. This system consists of eight schools for the white population, and one school for the negro population.

The first three school buildings built to serve the original town, Pine Valley, Elm Grove, and Cedar Hill, are of permanent type construction and have an estimate physical life of fifteen years. Three other schools; Glenwood, Linden, and Highland View; were built at later dates to serve the eastern and western expansions of the city. For reasons of economy they were planned for a greater capacity than the original schools. As a result, travel distance for children attending these schools was increased. These buildings have been classified as having a physical life of five years, primarily because of the type of exterior siding material used. Their usefulness could be extended to fifteen years by certain minor improvements.

These six schools are located north of Oak Ridge Turnpike, and, while not ideally situated in the center of the neighborhoods in each instance because of the difficulty of locating suitable sites in the hillside areas, they may be considered the nucleus of the future permanent elementary school system. It will be noted that the Pine Valley School is located too close to Cedar Hill School for a desirable distribution of schools, geographically centered in areas of similar physical size and population; also that there is a deficiency of school facilities in the neighborhoods in the west half of the city north of the Turnpike, which necessitates the transportation by bus of a great number of these children to the Fairview and Gamble Valley Schools south of the Turnpike.

The Fairview and Gamble Valley Schools are temporary buildings which were constructed to serve the former trailer and hutment developments south of the Turnpike. The

Fairview School will be required for the surplus school population north of the Turnpike until new facilities can be provided in those areas. Since it is of limited physical life and is in the area selected for the new Administrative Center, it ultimately should be abandoned. The Gamble Valley School may be used as a temporary facility for the next two or three years because of its location. There is also the probability that because of certain renovations and additions made since it was originally built that its use may be extended several years by additional rehabilitation.

The Scarboro School, at the intersection of Scarboro Road and Bethel Valley Road, now is being utilized for the negro elementary school population. It is a former county school of permanent construction and is adequately serving its present purpose. Bus transportation must be provided for all of the children attending the school. However, the Scarboro school is within the new security area and, therefore, must be allocated to some other purpose. The Master Plan contemplates the development of a new neighborhood for the negro population, with an elementary school as the nucleus.

The elementary schools generally are deficient in outdoor playground area, and recommendations have been made to increase these areas at schools which are to be continued in permanent use. The present number of elementary schools, students, and the school plant capacities of each school are set forth in the following tabulation:

School	Students as of Nov. 7, 1947	Number of home classrooms (Excluding special purpose rooms)	School Capacity*
Cedar Hill	493	15** (including 2 kindergarten)	425
Elm Grove	528	15 (including 2 kindergarten) 4 (temporary)	425 100
Fairview	517	20 (including 1 kindergarten)	525
Gamble Valley	362	14 (including 1 kindergarten)	375
Glenwood	696	18 (including 2 kindergarten) 2 (temporary)	500 50
Highland View	791	25 (including 2 kindergarten)	675
Linden	805	25 (including 2 kindergarten)	675
Pine Valley	512	15 (including 2 kindergarten)	425
Scarboro	110	10	250
TOTAL	4,814	163	4,425

Junior High Schools

The junior high school system includes the seventh through the ninth grades, and is quartered in a group of buildings comprising the Jefferson Junior High School, located on Robertsville Road near Illinois Avenue, in the west part of the city. This group of buildings includes a small elementary school building to which has been added a large group of class-

*School capacity based on number of home classrooms times the average size class of 25. Allowance made for double shift in kindergarten rooms.

**Includes 1 new home classroom out of 4 built. Other 3 are for special purposes and are to be used by students of the entire city.

room wings, a shop building, and gymnasium, all of which have an estimated physical life of five years. The school membership was 1,211 pupils as of November 7, 1947. The present school plant has a capacity of 1,500 pupils. Because of its physical condition it should be continued in use only until permanent facilities can be provided.

High School

The high school system includes grades ten through twelve. The Oak Ridge High School is located immediately north of Jackson Square in one main building and an annex of permanent type construction, both having an estimated physical life of fifteen years. The building was originally planned for a 500-student capacity, but was later enlarged to accommodate 750 students. Although the desired maximum capacity of the present building is 750 students, its use has been temporarily increased by an "extended hour" program to 950 pupils. Because of the limitations of the site, it will not be possible to add to the present building or provide the additional outdoor athletic facilities considered adequate. Furthermore, this site is no longer centrally located in the city.

FACTORS TO BE USED IN DETERMINING THE SCHOOL LAND CAPACITIES REQUIRED

The Master Plan is limited to studying the expected child population sufficiently only to determine the amount and location of school land needed. It is to be understood that the discussion which follows on the size of school buildings is carried only to the precision necessary to make clear the functional relation of building capacity to land capacity.

The most significant peculiarity of the Oak Ridge population is the extremely high ratio of young children to total population. This is chiefly attributable to a condition generally found in new urban developments. Where the percentage of young couples to old couples is high, with its accompanying high percentage of women of child-bearing age, the ratio of young children per family will also be high.

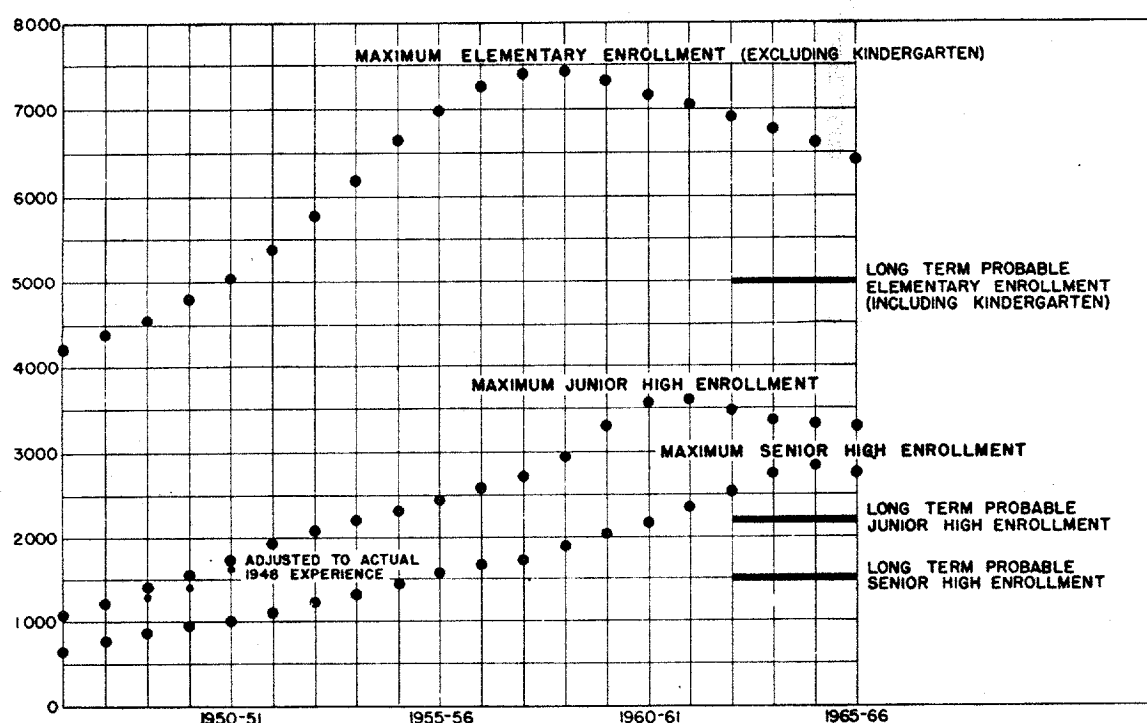
There are many instances in new urban development areas where the school plant has been built large enough to take care of this first wave of children, only to have the schools partially empty as the first generation of families grew older and the neighborhood came to have a more normal complement of young and middle-age families.

In the estimate of the school capacities that should be built at Oak Ridge, it has been assumed that permanent school buildings will be provided only for the probable long-term number of children. Thus, temporary additions to schools and the longer occupancy of some of the war temporary schools will be necessary to take care of the maximum peak of the child population curve.

Further study will have to be made analyzing the engineering economy of permanently building some accommodations in addition to long-term requirements which might have sufficient permanent utility to make permanent rather than temporary construction an economy. Such permanent utility might include use as nurseries, special purpose rooms, or special neighborhood social and recreation requirements.

While more precise cost analysis is required in the building program, the land use cost analysis requires less precision. The cost of allocating undeveloped land to school use in large enough acreage to meet the need for the peak of the child population curve instead of just enough for the long-term school population, is an extremely small per cent of the total school plant development cost. Furthermore, any excess land over the long-term school need has conspicuous permanent utility as neighborhood park land. School land, therefore, was allocated on this basis.

The school population was estimated by two methods, the first giving the probable number of children to be expected on a long-term basis and the second giving the approximate maximum peak of the elementary school children population curve which we believe will occur between 1955 and 1960. This peak will occur in the high schools approximately six years later. These results are illustrated in the chart below. For details of the method, see "Preliminary Master Plan."



ESTIMATED SCHOOL ENROLLMENT FOR 50,000 POPULATION

PROPOSED SCHOOL FACILITIES

Elementary Schools

The proposed permanent elementary school system, as shown on the Master Plan, is outlined here. Schools to be abandoned for the reasons given above are Fairview and Scarborough.

School	Neighborhood	Capacity of Bldgs.	School Population	
			Probable Long-term	Approximate Maximum
<u>Existing Elementary Schools</u>				
Glenwood	1	550 (50 temporary)	420	530
Elm Grove	2	525 (100 temporary)	480	600
Cedar Hill	3	425	360	460
Pine Valley*	4	425	500	620
Highland View	5	675	440	550
Linden	7	675	440	550
Gamble Valley	10	375	550	690

*Ultimately to be relocated on a new site on Pennsylvania Avenue at Palmetto Lane.

School	Neighborhood	Capacity of bldgs.	School Population	
			Probable Long-term	Approximate Maximum
<u>New Elementary Schools</u>				
On Robertsville Rd. between Iroquois Rd. and Jefferson Ave.	6	525**	360	450
On Robertsville Rd. from Briar Rd. west	8	—	430	530
In new neighborhood	9	—	360	450
In new neighborhood	11	550***	430	530
In new neighborhood	12	—	430	540
In new neighborhood	13	—	400	500
TOTAL ELEMENTARY SCHOOLS		PERMANENT	5,600	7,000

Additional play area has been planned at all of the existing schools, as far as possible, to accommodate all school and neighborhood recreation activities in accordance with accepted standards for these facilities.

The proposed Junior and Senior High School systems as shown on the Master Plan are as follows:

Junior High Schools

One junior high school is to be located in the existing Oak Ridge High School building to serve the neighborhoods in the east part of the city. The estimated probable long-term junior high school population in these neighborhoods is approximately 900 students. The desirable capacity of the present high school building to be utilized is 750 students. Therefore, junior high school boundaries will not exactly coincide with neighborhood boundaries and approximately 150 students in these neighborhoods will attend the west junior high school.

Because of the physical limitations of the site, only the minimum requirements for play-field and athletic field activities have been met. Additional facilities of this type will be provided at a nearby location as described in the Recreation Section of this report.

One new junior high school is to be located in an area bounded by Oak Ridge Turnpike, Illinois Avenue, Robertsville Road, and Highland Avenue extended south, to serve the neighborhoods in the west part of the city. The estimated probable long-term junior high population in these neighborhoods is approximately 1,300 students.

The existing Jefferson Junior High School can be utilized for the period of its estimated physical life to accommodate 1,500 junior high students. By then the proposed new senior high school should be built and the present high school turned into a junior high school. The new west Junior High School can then be programmed and built as requirements demand. This site is located at a good geographical focal point of the high density portion of the population it is to serve. It also adequately meets desired building and recreation space standards, and is sufficiently close to the existing building to permit the construction of play fields and other facilities ahead of the entire replacement of the existing building.

**Being constructed on expanded basis to temporarily accommodate some of neighborhood 9.

***Being planned on expanded basis because of greater density obtained in detailed planning of this neighborhood.

The school authorities believe that the negro population will be insufficient to require a high school. Therefore, they recommend that junior and senior negro high school students should be transported to and from Knoxville. Until such time as Anderson County makes provision for the education facilities required by this group, both in the cities within the County and in the rural areas, the above solution will prevail.

Senior High School

One new senior high school is to be located north of Oak Ridge Turnpike, between the area selected for the new west Junior High School and Viking Road, and bounded on the north by Providence Road. The estimated probable long-term senior high school population is approximately 1,500 students. Plans are currently being prepared for a building to accommodate 1,500 students.

This site is adequate in size to accommodate the required standard-size high school athletic field and playfield facilities for city-wide recreational use. It also provides sufficient area to accommodate ample parking facilities required for the large number of cars anticipated in connection with athletic events and general public use of the High School auditorium.

OTHER EDUCATIONAL FACILITIES

It also should be considered that the following functions may be required at some future date, Junior College, University of Tennessee Extension, Adult Education, and Oak Ridge Institute of Nuclear Studies. They have a similarity of location requirements and would complement each other if located together. Consideration has been given to reserving space for them in the Cultural Center, or adjacent in the Administrative Center.

The three present nursery schools; Tennyson, Grove, and Nesper House; are operated by the Oak Ridge school authorities who have recommended that nursery school facilities be provided in all elementary schools. Although it is not within the scope of the Master Plan to make this determination, being rather one of local administrative concern, nursery facilities logically should be located at neighborhood centers.

RECREATION

The provision of public recreation facilities generally has come to be regarded as essential in every community. It has been demonstrated that opportunities for recreation in attractive natural surroundings are a necessity for all age groups. Recreation means more than just leisure-hour fun: it means health, relaxation, and community spirit for adults as well as children. It is a primary factor in education, good citizenship, and good living.

While large parks are very useful, they are not enough. The everyday needs of the people require that playgrounds, neighborhood parks, playfields, athletic fields, and community buildings be scattered through the city, where they are convenient and may be used frequently. They should be developed in accordance with standards for specific facilities to meet the varying recreation needs.

Before future requirements were determined, the existing areas and facilities were evaluated in terms of acceptable standards.

EXISTING FACILITIES

The present outdoor municipal recreation facilities at Oak Ridge consist of eight playgrounds at elementary schools, two summer playgrounds and five picnic areas. There are also three baseball fields, nine softball fields, twenty-two tennis courts at two locations, horseshoe courts at two locations, and a large outdoor swimming pool. Indoor municipal recreation is provided in two youth centers, a community and recreation center for negroes, and three recreation centers for whites. With the exception of the Ridge Recreation Center at Jackson Square, all of these buildings are temporary in nature. However, certain of these buildings could be rehabilitated for extended use. Other indoor recreation is provided in the gymnasiums of the school buildings.

There are no neighborhood parks or large parks where active and passive recreation may be enjoyed. The school and other playgrounds are not fully developed and are inadequate in size in most instances. Playfield facilities for active sports are scattered through the city rather than concentrated at strategic locations. Indoor facilities generally are inadequate to accommodate the present requirements of both school and recreation departments. It is evident that a replanning of the entire community recreation system is required. In most cities it would be difficult to provide ample park and recreation areas after the city has been developed, but at Oak Ridge this may be accomplished readily in conjunction with the redevelopment of the major part of the city.

Commercial indoor and outdoor recreation facilities include five motion picture theatres, four bowling establishments, one skating rink, one open-air theatre, one golf driving range, and three commercially-operated recreation halls.

Private recreation facilities include a nine-hole golf course, a gun club, and several organization club houses.

PROPOSED FACILITIES AND DESIGN STANDARDS

The recreation facilities and areas shown on the "General Development Plan" and "Recreation Facilities" maps are based upon generally accepted standards for public recreation areas. The general type of facilities provided are playgrounds and neighborhood parks for neighborhood use, and playfields, athletic fields, large parks, and reservations for general community use. A description of each type and the standards of design utilized in the formulation of these recommendations follows:

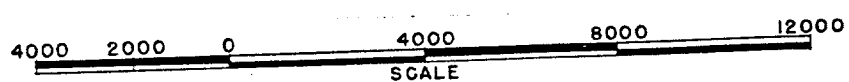
Playgrounds are to be located at the elementary school in each of the thirteen neighborhoods, which is the preferable location for such a neighborhood function. These areas are primarily for the active recreation of the children of elementary school age. They also should provide space where the pre-school child can play in a protected area under the care of an accompanying older person, as well as the play facilities for young people and adults of the neighborhood that require little space. Some of the existing sites are adequate, while

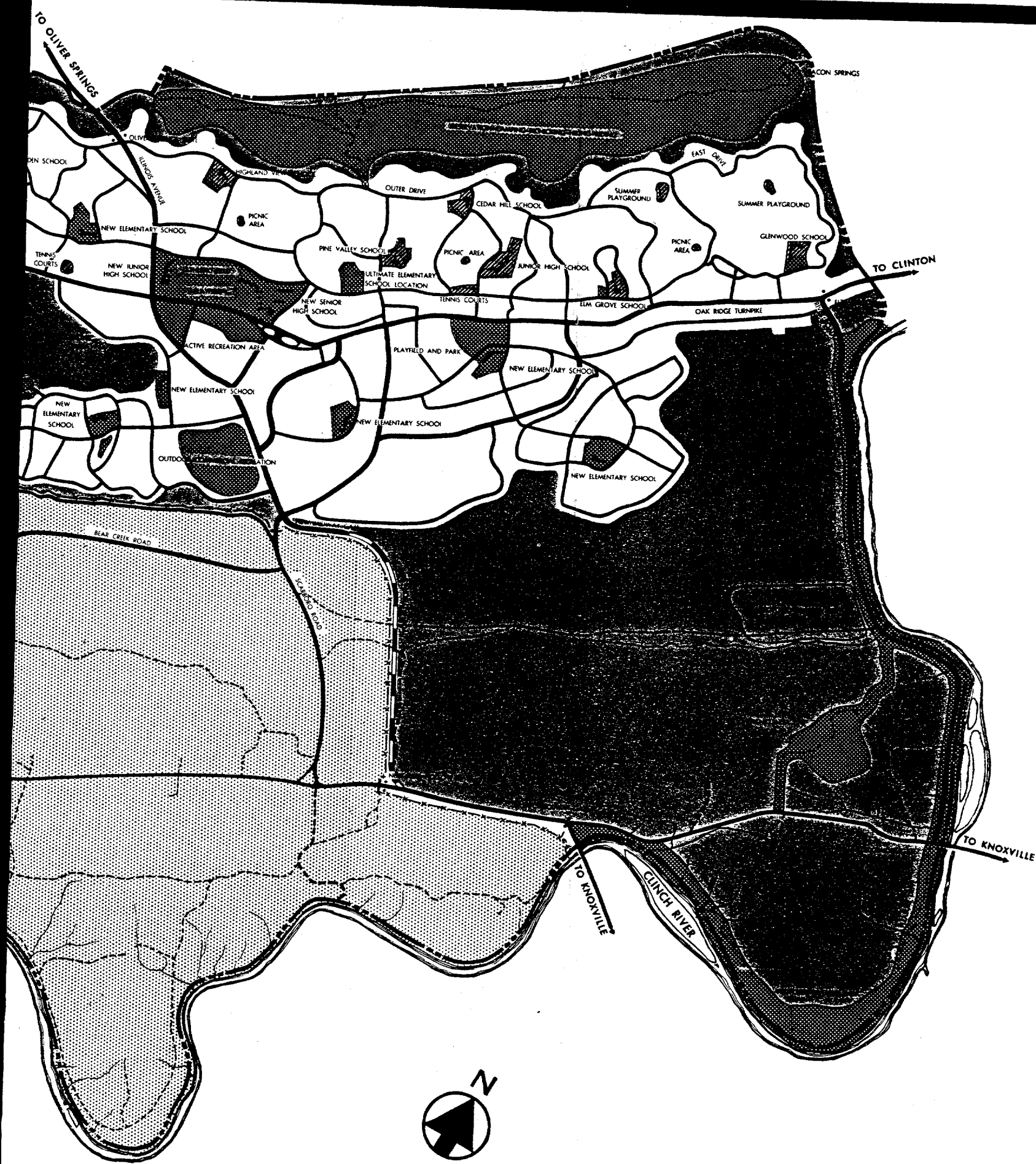






RECREATION FACILITIES

OAK RIDGE, TENNESSEE

UNITED STATES ATOMIC ENERGY COMMISSION
SKIDMORE, OWINGS AND MERRILL, ARCHITECT — ENGINEER





-  GREENBELT AREA
-  EXISTING RECREATION AREAS
-  PROPOSED RECREATION AREAS
-  RESTRICTED AREA

additional playground space is proposed at others. In addition to playgrounds at the elementary schools, several other recommended playgrounds are shown on the plan.

Design Standards

Size:	Varies with neighborhood population.	
	Population of Neighborhood	Size of Playground Needed
	3,000	4.0 Acres
	4,000	5.0 Acres
	5,000	6.0 Acres
	Note: For city as a whole, one acre for each 800 of total population.	
Location:	Preferably at elementary school, one for every neighborhood of 3,000 to 5,000 people.	
Facilities:	Shelter house, apparatus for younger and older children, open space for softball, baseball, volleyball, etc., handicraft and quiet games area, night lighting, landscaping, etc.	

Neighborhood Parks are intended primarily to provide an attractive neighborhood setting and to afford a place for quiet passive recreation for all ages. Area for this type of park facility has been provided in conjunction with the playground at all thirteen elementary schools. This location is considered preferable, both from the viewpoint of developing strong, attractive neighborhood centers where all recreational and cultural activities are grouped, and also from an administrative and maintenance standpoint.

Design Standards

Size:	Four to seven acres when an individual unit, two to four acres when located in conjunction with school and playground.
Location:	Preferably at playground, playfield or school.
Facilities:	Lawns, shrubbery, trees, walks, benches, etc., for quiet passive recreation for all ages.

Playfields are areas for the active organized play of older children and adults, which require too much space and equipment for the neighborhood playground. Part of the area, however, may be developed for playground activities. Many of the playfield facilities are used for the junior and senior high school physical education and sports program, as well as by the general public for intramural league games and other active group recreation requiring the same facilities. The best location for a playfield, therefore, will be adjacent to or at the junior or senior high school sites. It is proposed to locate playfield activities at the new west Junior High School and at the Senior High School. The site of the present Senior High School, eventually to be utilized for the east Junior High School, is restricted in area. Additional playfield activities for these neighborhoods are proposed in the new large park area immediately south of Oak Ridge Turnpike, in the present A.E.C. Administration Building area.

Design Standards

Size:	Ten to thirty acres or more. One for every 15,000 to 25,000 people. For city as a whole, one acre for each 800 of total population.
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Location:	Preferably at junior or senior high schools.
Facilities:	Fields and courts for softball, baseball, basketball, football, volleyball, soccer, handball, archery, horseshoes, bowling, tennis, swinging, bandstand, picnicking, night lighting, landscaping, etc.

Athletic Fields should provide additional facilities for highly organized games and sports that attract large numbers of spectators. Areas sufficient to accommodate football fields, baseball diamonds, and track facilities, as well as the bleacher and parking space requirements for spectators, should be provided. These facilities are available at the present Senior High School, which is to be converted to the east Junior High School, and are proposed at the new west Junior High School and Senior High School locations as well. These proposals are made in connection with amateur high school or community league participation only. Facilities for professional baseball games have been provided in a separate location along with other existing outdoor commercial recreation facilities, including a drive-in theatre and golf driving-range, in the area south of the main business center.

Design Standards

Size:	Ten to twenty acres.
Location:	Preferably away from residential neighborhoods. Also one for each high school.
Facilities:	Large space for running track and major sports, small space for minor games, bleachers or grand stand, parking lot, etc.

Large Parks providing for the more passive type of recreation in pleasant surroundings, as well as for a certain amount of active recreation, are proposed in two areas. One is in the present AEC Administration Building area, and the other in the area adjoining the proposed Administrative Center. Special features such as band stands and outdoor theatres, as well as open lawn areas, may be accommodated in these areas. Since Oak Ridge is located in an area that abounds in excellent passive recreation opportunities, it is planned to devote a greater than normal percentage of these parks to active recreation.

Design Standards

Size:	Size depends on additional facilities considered desirable.
Location:	Depends on natural features, and available land—one for every 40,000 people (broad standard).
Facilities:	Large areas of woods and open lawns, scenic drives and paths, streams and lakes, areas for active play for all ages, special features, such as band shells, zoo, etc.

Note: With Oak Ridge's large encircling area of natural development, this type of park area can be reduced and devoted to more active recreation.

Reservations are areas set aside to preserve certain natural scenic features and native growth and to provide opportunities for camping, picnicking, hiking, riding, and other activities of this nature. The greenbelt area shown on the "Recreation Facilities" map is restricted to forestry, agriculture, and recreation uses and should always be kept free of concentrated development by the restrictions provided in the zoning ordinance. Certain portions of the area indicated by black hatching on the map are recommended for special treatment

and are reserved for public recreational use. Special recreational services may be provided such as a golf course, picnic areas, trails, boating and fishing centers, and camp sites for Boy and Girl Scout, or other children's groups, but the primary purpose is for outdoor recreation in naturalistic surroundings. The bulk of this acreage should be preserved and maintained in its native state.

The areas indicated on the map include a large acreage on the north slope of the ridge running along the north limits of the city, extending from Oliver Springs Gate to the east reservation boundary; this area is accessible by numerous paths and trails from the residential areas to the south and an existing patrol road. It is mostly wooded and contains a stream and spring, Brushy Fork and Bacon Spring, and provided ample opportunity for picnicking, riding, and hiking. It also provides adequate camp sites for youth organizations. Another area shown is the proposed riverside park and pleasure drive area along the Clinch River from Elza Gate to Solway Gate. This entire riverfront area is unspoiled. It affords fine views of the river and surrounding hills, good fishing, boating and picnicking opportunities, and a possible bathing beach, if the upstream cities can be induced to treat their sewage instead of emptying it into the river. Another area is the one proposed near Edgemoor Gate, between River Road and Bethel Valley Road. This area is on high land, providing good river views, picnicking, and camp sites. There is also an area in the west part of the city, along Oak Ridge Turnpike, which is proposed as an eighteen-hole Municipal Golf Course.

Design Standards

Size:	Dependent on natural features—(generally accepted standard of 10 acres per 1,000 population).
Location:	In outlying region.
Facilities:	Camp and picnic areas, bridle paths, hiking and nature trails, woods and meadows, game preserves, scenic drives, streams, and lakes, and other special facilities such as golf courses, swimming pools, and bathing beaches.

The people of Oak Ridge also have access, within driving distance, to an unusually large number of well-developed county, state and federal parks, forests and game preserves. These areas are shown on the Regional Map.

The following table shows the acreage recommended for the proposed playground and neighborhood parks in each neighborhood, and for the proposed playfield and athletic fields, and large parks for the entire city.

Neighborhood	School	Playground Acreage	Neighborhood Park Acreage	Building and Setting Acreage	Total Acres
1	Glenwood	4.5	2.5	6	13
2	Elm Grove	5	3	3	11
3	Cedar Hill	4	2	3	9
4	Pine Valley	5	3	3	11
5	Highland View	4.75	2.75	5	12.5
6	New	4	2	3	9
7	Linden	4.75	2.75	5	12.5
8	New	4.5	2.5	3	10
9	New	4	2	3	9
10	New	5.75	3.75	3	12.5
11	New	4.5	2.5	3	10
12	New	4.5	2.5	3	10
13	New	4.5	2.5	3	10
Sub-totals		59.75	33.75	46	139.5

School	Playfield Acreage	Athletic Field Acreage	Parking and Planting *	Total Acres
West Junior High	15	12	4	31
East Junior High	0	12 (existing)	0	12
Senior High	30	20	22	72
Sub-totals	45	44	26	115
* excluding buildings				
Large Parks	Playfield and Other Active Recreation		Special Features and Open Areas	Total Acres
Area in Neighborhood 12	20		26	46
Area north of new Adminis- trative Center	30		21	51
Sub-totals	50		47	97
TOTAL				351.5

In addition to the above-outlined recreation facilities, which include certain existing recreation facilities in the general land areas, such as elementary school playgrounds, the swimming pool, and a few softball fields, there are other existing facilities located throughout the city that are included and shown as a part of the recommendations. These are to be retained at their present locations and consist of two summer playgrounds, five picnic areas, twenty-two tennis courts, and two sets of horseshoe courts. However, these are not included in the above table. Neither are the reservation recreation facilities included, inasmuch as surveys have been made of these areas only to determine their suitability for the recommended uses.

Indoor Recreation Centers

Indoor recreation facilities are just as essential as outdoor facilities in a well-balanced recreation system. They are needed in every neighborhood. The building utilized for such purposes may be a school operated as a neighborhood or community indoor recreation center, or a special recreation center building. It should provide diversified indoor facilities to meet varied recreation interests. It should be designed for economical maintenance and supervision and to accommodate several groups at a time. It should be located as near as possible to the center of the neighborhood or neighborhoods it is to serve. It should adjoin playgrounds or playfields in order that indoor and outdoor recreation programs can be coordinated and efficiently operated.

Properly designed school buildings can be made to serve as recreation centers as they frequently provide many of the indoor facilities usually included in recreation buildings. Where existing facilities are limited and dual use of the school building would overtax these facilities, separate recreation centers should be provided. The desirability of so planning new schools as to meet the needs of both school and community groups, however, is obvious.

At present time an unduly heavy proportion of the indoor recreation load at Oak Ridge falls on the schools and recreation centers, because church and club facilities are extremely limited. As these organizations build their own buildings, this load will decrease.

With the building of new schools as proposed at Oak Ridge there is the opportunity to realize an unusual combination of joint uses of these buildings, which will go a long way, if not all the way, toward meeting the community indoor recreation needs. In this way the expenditure required for separate buildings will be eliminated or at least considerably reduced.

The total community requirements for these needs to be provided at schools or else-

where may be derived from the design standards generally considered desirable:

Design Standards

- A gymnasium for each 10,000 of population or less.
- An auditorium or assembly hall for each 20,000 or less.
- A social room or playroom for each 10,000 or less.
- An informal reading and quiet game room for each 10,000 or less.
- A game room for each 10,000 or less.
- An arts and craft shop for each 10,000 or less.
- A multiple-use club room for each 4,000 or less.
- An indoor swimming pool for each 50,000 or less.

On the basis of these standards, the ultimate population of 50,000 would require at least two large auditoriums, an indoor swimming pool, four or five gymnasiums, playrooms, reading rooms, game rooms, arts and craft rooms and the approximate number of club rooms, refreshment bars, kitchens, service and storage rooms.

Commercial Indoor and Outdoor Recreation

No standards are applicable to this type of recreation facility, as local tastes and preferences vary widely. The present number of theatres, bowling alleys, and other commercial recreation facilities appears to be adequate for the present population. With an expected increase in population, additional facilities will doubtless be required. Ample land area allocations have been made in the Master Plan for this expansion.

BUSINESS

PROBLEM

Since the primary purpose of business establishments is to serve the people, and at the same time operate at a profit, it follows that they must first of all be of the required number, the kinds needed, and so distributed and located that they fulfill these functions.

In order to achieve these aims, the errors of past business development elsewhere must be avoided. There must be no over-building of retail stores resulting in vacancies, excessive turn-over in store property, and high rate of business failures among individual store keepers. Store facilities must be planned which the population and annual income require and can ably support. Sufficient facilities and space should be provided to meet all future requirements, but care must be exercised that they are provided to the best interest of the consumer, the merchant, and the community.

The shopping facilities should be so planned that stores will be grouped into modern shopping centers, well distributed in the neighborhoods, secondary centers, and in one main center. Each center should be designed as an integrated unit with ample space for parking, adequate landscape setting, access streets and delivery services.

EXISTING FACILITIES

The present business development consists of three general types—main shopping centers, neighborhood shopping centers, and scattered individual stores. These facilities are housed in buildings of various types and character, ranging from permanent buildings planned for commercial usage to hutments and shacks being used temporarily because of the lack of other accommodations.

Jackson Square was planned as the main shopping center of the original town of 3,000 dwelling units. As the city increased in size, however, it was not considered practicable to increase these facilities because they no longer were centrally located and there was no room for expansion. Therefore, another shopping center was built at Grove Center.

The original town also included three neighborhood shopping centers at Elm Grove, Pine Valley, and Outer Drive. Later, centers were built at East Village, Jefferson Center, Hilltop, and West Village.

In addition to these planned facilities; shopping centers of more temporary character developed in the Middletown area at Illinois Avenue and Oak Ridge Turnpike. The latest business development to be established is the Municipal Market located at Scarboro Road and the Turnpike, in a remodeled cafeteria building. Other business enterprises and offices have located throughout the city in structures originally built for other purposes.

It is evident from the present utilization of all kinds of buildings for retail purposes, and from observation of the crowded conditions and resultant poor service in many of the stores, that there is a great need for well-planned permanent business buildings. Further, since the physical life of a great portion of these buildings is extremely limited, the need is immediate.

The Phase "B" evaluation and analysis of commercial structures disclosed that the only buildings which have an estimated physical life of more than ten years are the Jackson Square development, the Telephone building and annex, the Grove Center development, the five neighborhood shopping centers at Pine Valley, Outer Drive, Elm Grove, East Village, and Jefferson Center, and several filling stations, service stations and garages. These buildings occupy 260,000 square feet or 6.2 acres of ground floor area or fifty-five per cent of the total of 490,000 square feet or 11.2 acres floor area being utilized for business purposes. They also occupy about fifty per cent of the total land areas, including parking, storage yards, and driveways, being used for business purposes.

METHOD USED TO DETERMINE FUTURE REQUIREMENTS

In the study of methods to be used in the planning of business facilities for Oak Ridge, it was determined that the use of purchasing power as a basis for measuring these requirements was the most logical. The three elemental phases of commercial economy which were

considered before planning these facilities are: (1) the total sales volume of the community; (2) the probable distribution of the local retail dollar by kinds of business; and (3) the approximate sales volume and size of successful store in each classification.

Although figures on total retail sales were available at Oak Ridge, and were \$17,140,000 for the year 1947, it was decided that they should not be used as a basis for the determination of total sales volume because: (1) the existing facilities were generally provided under the pattern of minimum wartime construction, which are not considered adequate for normal operations and, therefore, do not reflect normal average city sales; (2) it was believed that due to the lack of certain types of stores, a considerable percentage of purchases are made outside of the area; and (3) these figures do not include any sales from the surrounding trade areas, which must be taken into consideration in planning these ultimate facilities, since the city is to be opened to the general public at an early date.

In the "Preliminary Master Plan," therefore, the commercial space requirements of Oak Ridge were estimated by comparing the retail sales and services of 31 southeastern cities of comparable size and translating the dollar volume of the various types of retail stores and services into square feet of sales area required. The sales figures and ratio of dollar volume to square feet of sales area were based on statistics from the 16th Census of Business - 1939 "Retail Trade" and on chain store business volume figures. It was considered that this was a reasonably accurate method of determining required areas since there is a fairly constant relationship between required floor area and physical quantity of merchandise sold regardless of price fluctuations.

In the Fall of 1948, however, a separate survey of Oak Ridge commercial facilities was made. While there were minor differences, this survey indicated that the land allocated for commercial use in the "Preliminary Master Plan" for a city of 50,000 was essentially correct.

This survey entitled "Commercial Survey of Oak Ridge," November 2, 1948, determined the shopping requirements for the immediate future based on the present population of 36,000. Trade from outside of the city was estimated at an extremely conservative figure as such trade takes some years to develop. On this basis the total volume of retail sales and services during the next five years was estimated in the survey at \$32,000,500 or \$881 per capita.

The Master Plan must adjust the commercial survey figures to long-range estimates of population and buying power. The maximum population has been estimated at 50,000. When Oak Ridge business becomes better established in the trade area, it may be assumed that outside trade will increase and that total retail sales and services will reach \$50,000,000 or \$1,000 per capita. This is still about \$200 below the average per capita sales in 1947 for American cities.

An estimate of immediate and ultimate volume of sales distributed between the central business district and the secondary and neighborhood shopping centers is contained in the following table:

	<u>Commercial Survey</u>	<u>Master Plan</u>
	(36,000 population)	(50,000 population)
Neighborhood & Secondary Centers	\$12,000,000	\$15,000,000
Central Business District	<u>\$20,500,000</u>	<u>\$35,000,000</u>
Total	\$32,500,000	\$50,000,000

Having determined the total ultimate volume of retail sales and services and the distribution of such sales between the central business district and the neighborhood and secondary centers, the space required in each district was determined by the factors of dollar volumes per square foot established by the commercial survey.

FUTURE NEIGHBORHOOD AND SECONDARY CENTERS

The \$15,000,000 volume of retail sales and services estimated for the neighborhood and

secondary shopping centers will require retail sales space of approximately 400,000 square feet and a total land area allocated to such centers of approximately 35 acres. The following table summarizes the location and size of each neighborhood and secondary center as shown on the "General Development Plan":

Location	Building Area	Land Area	
		Including Building	
Existing Neighborhood Centers	Square Feet	Square Feet	Acres
East Village	12,600	60,400	1.39
Outer Drive	9,100	29,400	.68
Elm Grove	10,500	39,400	.91
Pine Valley	9,100	39,400	.91
Hill Top	12,600	57,200	1.31
West Village	13,500	54,200	1.24
Sub-total	67,400	280,000	6.44
New Neighborhood Centers			
5 New Centers in Neighborhoods 3, 5, 11, 12, and 13	45,000	198,000	4.55
1 New Center in Neighborhood 10	58,000	160,000	3.67
Sub-total	103,000	358,000	8.22
Existing Secondary Centers			
Jackson Square	95,500	377,000	8.70
Jefferson Center	78,000	314,000	7.20
Miscellaneous Uses to be Retained	57,500	208,000	4.78
Sub-total	231,000	899,000	20.68
TOTAL	401,400	1,537,000	35.34

It will be noted that the neighborhood pattern of shopping centers has not been altered, except for the addition of new centers in new neighborhoods. It is planned, however, to increase the facilities in the Hilltop and West Village centers to bring these facilities up to the standard of the others. However, only those stores and services which frequently are used by all families and which should be readily accessible to the dwellings should be included in the neighborhood centers. The existing neighborhood centers which generally include a food store, drug store, barber shop, beauty shop, dry cleaner, and laundry pick up service may be used as a pattern for the new centers. The exception at Oak Ridge is the shopping center for negroes in Neighborhood 10, which in addition to these facilities should probably include other facilities such as eating places, clothing stores, a filling station and auto repair, shoe repair, office space, pool hall, bowling alley, and a theatre.

Jackson Square is retained as a secondary shopping center because of the permanence of development and location and because it is a well-planned center with ample parking facilities. It is anticipated that the business of Grove Center will eventually transfer to the central business district, because it is located too near the proposed district to maintain the sales volume necessary for successful operation, and the land is needed for other purposes. For this reason, Jefferson Center has been selected as the west secondary shopping center. It is anticipated that this center will be completely redesigned and possibly enlarged when the present temporary facilities are replaced. The secondary shopping centers will contain similar establishments as the neighborhood centers but also will accommodate other types of businesses that will probably want to locate outside of the central business district.

Certain existing miscellaneous uses, such as permanent filling stations, the Guest

House, and others are to be retained in their present isolated locations as indicated on the "General Development Plan." All other business uses throughout the city are to be continued in temporary use only until adequate permanent facilities can be provided in newly established business areas.

FUTURE CENTRAL BUSINESS DISTRICT

The \$35,000,000 volume of retail sales and services estimated for the central business district, together with such other necessary facilities as a hotel, office building, library, post office, and so on, will require an estimated building area of approximately 24 acres.

In addition to the 24 acres of business ground floor area, area for adequate parking and servicing facilities, plaza space and landscape setting between store groups and pedestrian and automotive circulation, excluding bordering streets must be provided. Most authorities agree on recommendations varying from two to three square feet for each square foot of ground floor area. On the basis of the ratio of three to one, determined as most desirable, the total area to be allocated to the central business district, is approximately 100 acres.

The building areas required for each type of retail sales and services and for other miscellaneous facilities in the central business district are shown in the following table:

FUTURE CENTRAL BUSINESS DISTRICT	
Retail Sales and Services	
Type	Area in Square Feet
Automotive	167,000
Building Materials and Hardware	13,900
Home Furnishing Group	98,000
Jewelry	5,200
Apparel Group	66,200
Drug Stores	10,900
Eating and Drinking Places	30,000
Food Group	80,000
Filling Stations	25,400
General Merchandise	81,500
Other Retail Supply	54,500
Personal and Other Services	22,400
Total Net Selling Area	655,000
Plus 25% - Non-selling Area	164,000
Total Gross Area of Building	819,000
Other Required Facilities	
Hotel	15,000
Office Building	25,000
Post Office	18,000
Recreation	45,000
Library	20,000
Bus Station	36,000
Central Steam Plant	14,000
Used Car Lots	40,000
Total	213,000
TOTAL AREA - ALL BUILDINGS	1,032,000 square feet, or 24 acres.

The determination of the location, size, and plan of the central business district was a most important consideration of the Master Plan. The objectives governing site selection include; central location convenient to all the people of Oak Ridge, every access by main traffic arteries, serving both local and outside shoppers, elimination of heavy through traffic within the business district, and proper relationship to the adjoining administrative and cultural center.

The selected site, shown on the "General Development Plan," is an area of approximately 100 acres near the geographical center of Oak Ridge and close to the southeast and most important gateway of the city. It lies between and near the intersection of Oak Ridge Turnpike and Scarboro Road, the principal north-south, east-west traffic artery. These main highways together with connecting major streets form the boundary of the district, but do not pass through it. Within the district itself, well organized pedestrian and motor traffic together with adequate parking facilities are an integral part of the plan.

Oak Ridge has unparalleled opportunities of developing a complete central business district, planned and built as an integrated unit and incorporating all of the present-day concept of commercial planning which have been proved so successful in smaller shopping centers built recently in other cities.

ADMINISTRATIVE

GENERAL

In order to serve its function best, the administrative group of buildings, including A.E.C. and City Administration, should be located at the center of the city, where it will be most accessible and convenient to the greatest number of users.

These buildings should be not only centrally located, but also adjacent or close to the main shopping center, for the business conveniences of both the local user and the out-of-town visitor. They should be readily and conveniently accessible by common carrier as well as by automobile from all parts of the city and region.

They should be located in an area bounded by major flows of traffic, but not traversed by it, and of a sufficiently large size to provide easy access and egress and ample parking facilities for employees and visitors.

The sites selected for the buildings should be of the size and type most suitable for their functions and for the provision of the proper architectural and landscape setting.

EXISTING FACILITIES

A.E.C.

The major part of the present A.E.C. administrative facilities is located in the Administration Building, which is not a permanent structure, and in the adjoining former laboratories of permanent construction type approximately one and three-quarter miles from the proposed main city center.

Since the physical life of the main administration building is estimated at seven years, and the other accommodations being utilized were not planned for their present uses, replacement and possible consolidation in a permanent structure at a more central location is recommended. Other facilities are located in a converted dormitory in the Jefferson Center area.

City

The city administration facilities are located for the most part in several buildings of varying character and degree of permanence on both sides of Oak Ridge Turnpike in the area immediately west of Jackson Square. The city administration offices are quartered in two former dormitories, Cheyenne and Charlotte Halls, while the Police Headquarters, Education offices, Health Department, and Welfare and Recreation offices are located in temporary buildings in the area immediately south and across the Turnpike. The Roane-Anderson offices, which handle the greater portion of the city maintenance and operation activities, also are located in temporary quarters in this same general area. *

While the majority of these buildings have an estimated physical life of ten years, the Roane-Anderson offices, with a two-year life expectancy, and the Police Headquarters with a five-year life expectancy, will have to be replaced at an early date. Since replacement of all of the other facilities at a not too distant date also will be required, and the present locations are no longer near the center of the city, a consolidation of these facilities in one building or group of buildings at a central location is recommended.

PROPOSED FACILITIES

A.E.C.

While it is considered desirable to group the two types of administrative facilities in a centrally-located, city-government administrative center, it is believed that precedence

should be given to the A.E.C. Administration Building in the consideration of location and setting selected because of the special import that this building would connote to Oak Ridge. It would house the principal activities of the main function of the city and, therefore, should be most prominently and advantageously located.

The site selected for this building is in the central part of the city on a land prominence that will furnish extraordinarily attractive views from every approach. The site well lends itself to the architectural and landscape setting required for a building of this importance. Sufficient land area has been allocated to prevent any future development from encroaching upon the view and setting of the building and for the provision of adequate circulatory readways and parking facilities. The site is adjacent to the proposed main shopping center of the city and is readily accessible from all parts of the city by bus or private automobile. It is so planned and designed that it forms the nucleus of the administrative center of the city, which is in close relationship to the adjoining business center and to the high schools and auditorium comprising the main cultural center of the city.

City

The site selected for the proposed consolidation of the city administration facilities is immediately adjacent to the site of the A.E.C. building, where a suitable land area of sufficient size has been reserved to accommodate the normal city administrative activities and to provide the proper architectural and landscape setting. It is not the intent of this report to recommend whether all of the various departments of the city may be accommodated most successfully in one building or in a group of closely related buildings. It is recommended, however, that they be located within the land area reserved for this purpose for the convenience of users and for the facilitation of administrative routine.

Sufficient additional land also has been allocated adjoining the sites for these buildings to accommodate other governmental, county and city functions that possibly may require locations at some future date.

LIGHT-INDUSTRIAL, SERVICE, AND MAINTENANCE

GENERAL

The future of the average city depends primarily on the extent and strength of its industrial development, as people will live where they can find work. Fluctuations in city population in most instances are directly attributable to decreased or increased opportunities for employment.

The atomic plants and laboratories at Oak Ridge, corresponding to the heavy industrial development of the average city, are located outside of the city area, where ample room is available for any possible required expansion. As long as the reservation is controlled as a restricted area, it does not appear feasible or probable that private heavy industry will locate in that area. Even though it has been decided that Oak Ridge is to be opened to the public in the near future, the proposed development of the city requires all of the available buildable land. There should be no allocation for heavy industry at this time.

Therefore, the industrial land use problem at Oak Ridge narrows down to the provision of adequate, well-planned and well-located space for private light-industrial uses and for the city service and maintenance facilities. Sufficient land must be allocated and reserved in the city to accommodate efficiently the present needs of industry, service, and maintenance as well as possible expansion and future needs. All these activities ultimately should be consolidated into prescribed districts in order to protect residential areas, decrease the cost of public servicing, and increase the efficiency of industrial operation itself. As an exception, certain light-industrial usages that are not offensive or detrimental to residential or commercial values may be permitted in the main business center. Industrial areas should be separated from residential areas by highways, recreation areas, or protective greenbelts.

EXISTING FACILITIES

The present facilities grouped into this classification are of two types: (1) the light-industrial uses operated by private enterprise; and (2) service and maintenance operations provided by the A.E.C. for all physical improvements within the city.

Light Industry

Included in this classification are the two laundry buildings now not in service, several repair shops and garages, ice and cold storage plants, a diaper service, dry cleaning plants, and various miscellaneous light-industrial services, housed throughout the city in a variety of type of buildings, which for the most part originally were built for other purposes. With the exception of the ice and cold storage plants, several garages, and one laundry building most of the buildings housing these establishments have a very limited physical life and will have to be replaced at an early date.

Also included in this classification are the bus terminals and accessory office and repair buildings located at the central terminal on the Turnpike near Jackson Square and at Jefferson Center. While the terminal office and passenger station buildings and main repair shops have an estimated physical life of between ten and fifteen years, the auxiliary repair and service shops are rated at a physical life of less than five years, and will have to be replaced or abandoned at an early date.

Service and Maintenance

The second classification, housing the various A.E.C. and city service and maintenance facilities, such as warehousing, equipment repair, gasoline storage, building maintenance, roads and streets maintenance, utilities, coal buildings and yard, equipment pools, and school maintenance, are scattered through the entire city area south of the Turnpike with the exception of the school maintenance shops. The Phase "B" analysis disclosed that a considerable number of the buildings occupied by these facilities have limited remaining physical life and that very few of them are suitable for permanent use.

This analysis also included the principal utility structures including the steam plant, sewage treatment plants, and booster stations, which have been determined to be suitable for continued use as far as their physical structure is concerned.

FUTURE FACILITIES

Having determined that a large portion of the buildings in both classifications will have to be replaced at an early date, it was next decided that this replacement should be made in accordance with a plan for the consolidation of all of these activities into two major light-industrial areas, one existing and one proposed.

East Industrial Area (Elza)

The first area selected is the existing area immediately south of Oak Ridge Turnpike extending from Florida Avenue on the west to River Road on the east, and averaging about 1,200 feet in width. The greater portion of this area is now occupied by temporary warehouses and is being retained as an industrial area because it well serves its present function and is adequately and conveniently serviced by highways, railroads, and utilities. Also it is of sufficient size to accommodate the greater portion of the city warehouse requirements as well as privately operated light-industrial uses.

The area is separated from the existing residential development on the north by the Turnpike, and from the proposed residential development adjoining the area on the southwest by Florida Avenue extended. It can be effectively isolated by a proposed planting strip along these two streets. In addition, the permanence and desirability of the area for light-industrial uses already have been established as the first two new permanent warehouses are being built in this location.

Since the western half of the area is being cleared of many of the earlier temporary uses, and considerable vacant area already is available, this part will afford immediate accommodations for private light industry.

If at any time, for security reasons, it is considered desirable or necessary to separate the government uses from private uses, this readily may be accomplished because the area has been tentatively divided into two equal parts, one for each type of use.

South Industrial Area (Midway)

Since the East Area is not of sufficient size to accommodate the total light-industrial, service, and maintenance requirements of the city, a second area was added. This area is in the south part of the city, adjoining the present Midway Warehouse group on the east, where land of sufficient extent and of suitable topography is available for an efficient orderly industrial development. The area is adjacent to major highways, railroad facilities, and utility installations which readily may be extended into the area. It also is well separated by wooded hills from most of the future residential development.

It is proposed that the major portion of the present city maintenance and service facilities, now scattered through the entire area south of Oak Ridge Turnpike on land required for residential development, ultimately will be consolidated into a more efficient organization in this area.

Since the proposed priority program for the scheduling of residential development includes Neighborhood 11, where some of the service and maintenance activities are located, the first industrial development to be scheduled should be in the South Area and of sufficient scope to accommodate the uses now occupying this neighborhood. The temporary construction yards in this neighborhood should also be removed at an early date and relocated in the South Area or temporarily in Neighborhood 13 along an existing railroad spur, inasmuch as this will be the last neighborhood to be developed.

Other Areas

In addition to the two proposed main industrial areas described above and shown on the "General Development Plan," there also are several isolated light-industrial land uses.

These include the steam plant and connecting railroad, which will be retained in its present location where every feasible action should be taken to better the appearance of this very conspicuously located utility. The others are the equipment repair shops, oil storage, and bus repair and storage shops, which because of the large investment involved are to be allowed to remain in their present locations for the extent of their physical life. They all ultimately should be located in the proposed South Industrial Area, even though a considerable additional investment was recently made on the equipment repair shops, contrary to the Master Plan recommendations.

The estimated land requirements of the individual service, maintenance operations, and private light-industrial uses, are shown in the table below. For further details of these requirements see the "Preliminary Master Plan" and "Preliminary Analysis—Development of Midway and Elza Areas for Light Industry"—report dated August 1948.

EXISTING AND PROPOSED INDUSTRIAL AREAS AND USES *	
East Industrial Area (Elza)	
Central warehousing **	39.0 Acres
Sewage Disposal Plant **	8.5 "
Transportation (Bus) Service	7.0 "
Railroads, Streets, etc.	33.6 "
Private Light Industry	79.9 "
Sub-total	168.0 Acres
South Industrial Area (Midway)	
Municipal Services and Maintenance Operations	15.6 Acres
Asphalt Plant	2.0 "
Utilities	16.0 "
Building Maintenance	6.8 "
Lumber Yard	5.0 "
Coal Yard	3.0 "
School Maintenance	1.5 "
Salvage Yard	7.3 "
Construction Plant Operations	10.0 "
Possible New Gas Storage Facilities	4.0 "
Transportation (Bus) Service	7.0 "
Railroads, Streets, etc.	23.4 "
Sub-total	101.6 Acres
Other Areas	
West Sewage Disposal Plant **	10.0 Acres
Steam Plant and Connecting Railroad *	9.9 "
Railroad R.O.W. between industrial areas *	12.5 "
Bus Parking Area in vicinity of Jefferson Center	5.0 "
Sub-total	37.4 Acres
TOTAL	307.0 Acres

* Figures include buildings and land.

** Existing uses

TRANSPORTATION

STREETS

The system of streets and highways shown on the "Thoroughfares System Map" is designed to handle all vehicular transportation. It utilizes the present street system north of the Turnpike, with a few new alignments and extensions. The framework of the system may be seen on the map where existing roads are shown in black. The existing temporary streets and roads, laid out for other than residential use south of the Turnpike were, with few exceptions, of little value in the permanent system and will be replaced by new streets designed for the new development contemplated in this area. Proposed streets are shown in red on the map.

The proposed main thoroughfares consist of streets located for the most part along or near the boundaries of neighborhoods, freeing the residential areas from the hazards of through traffic. Arterial highways and access roads, fully integrated with the county and state highways, provide the major means of communication with the surrounding area and handle the heavier flows of traffic. Major streets serve as collectors of the traffic from the secondary streets and distribute it to the arterial highways and other parts of the city. Secondary streets collect the traffic from the neighborhoods and distribute it to the major streets and arterial highways. They also serve as the inter-connecting routes between the neighborhoods and in some instances form neighborhood boundaries. Minor roads, leading from the major and secondary streets into the neighborhoods, serve as access roads to the dwelling units. In this system the location and size of each street and highway is planned to perform its particular purpose.

Arterial highways and major streets which carry the heavier loads of traffic, including both private automobiles and buses should not be congested by parked cars. To enable these thoroughfares to serve traffic efficiently, it is planned that they will be used exclusively for moving traffic. Parked cars will be kept off these streets in off-street parking areas.

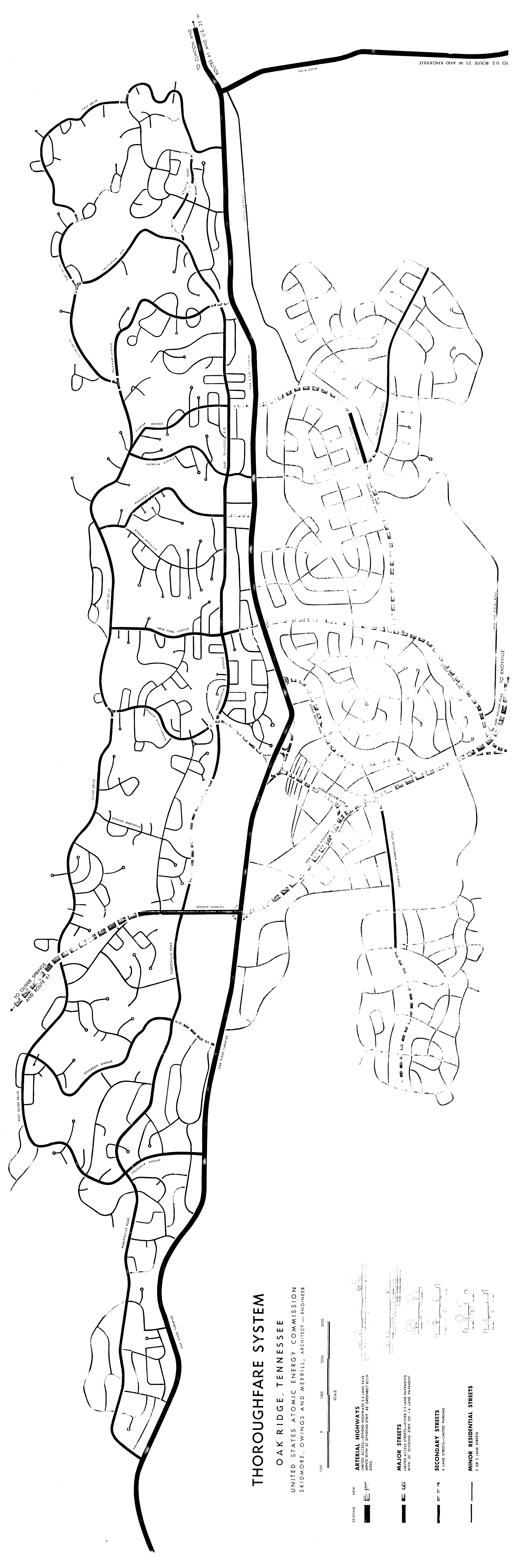
For the purpose of establishing standards for the streets and highways serving the various traffic needs of the city, the four general types of thoroughfares are described as follows:

Arterial Highways

These highways which will carry the heavier loads of traffic, both local and regional, are designed as limited-access roads to provide uninterrupted traffic flow. Intersections, therefore, are to be reduced to minimum intervals of 1/2 to 1 mile. Private properties will not abut directly onto these highways but will face away from them onto local minor streets. The proposed right-of-way of 250 feet will accommodate two-lane pavements of twenty-two feet in width in each direction, a center dividing strip of thirty feet and two eighty-eight foot planting strips on either side. This right-of-way also will accommodate any foreseeable future required pavement widening. The planting strips will provide adequate space for planting, protecting the adjoining developments from traffic noises and screening any possible unattractive development from the highway. They also provide room for pole lines which should be located at the outer edges of the right-of-way. No parking is to be permitted on these highways.

The three proposed highways of this type are: (1) Oak Ridge Turnpike, (2) Illinois Avenue - Scarboro Road - Kerr Hollow Road, and (3) River Road.

Oak Ridge Turnpike is the existing four-lane highway with center-dividing strip which forms the backbone of the entire street system. It extends through the city from Elza Gate to the western city limits, where it continues to one of the main plant areas. In addition to serving as the main access to the city from Clinton and U.S. Route 25 W on the east, it serves as the principal connection between the east and the west neighborhoods. The existing right-of-way is of adequate width, intersections have been kept to a minimum, and the adjacent developments generally face onto parallel minor streets. The addition of planting and the relocation of utility installations bring this highway up to the recommended standard, with



THOROUGHFARE SYSTEM

OAK RIDGE, TENNESSEE
UNITED STATES ATOMIC ENERGY COMMISSION
SKIDMORE, OWINGS AND MERRILL, ARCHITECT — ENGINEER

- EXISTING** **NEW**
- ARTERIAL HIGHWAYS**
LIMITED ACCESS—DIVIDED HIGHWAYS 22 LANE PAVEMENTS WITH 20' DIVIDING STRIP OF GREENBELT BOTH SIDES.
- MAJOR STREETS**
LIMITED ACCESS STREETS—EITHER 22 LANE PAVEMENTS WITH 20' DIVIDING STRIP OR 14 LANE PAVEMENT.
- SECONDARY STREETS**
4 LANE STREETS—LIMITED PARKING
- MINOR RESIDENTIAL STREETS**
2 OR 3 LANE STREETS

the exception of center-strip width.

The Illinois Avenue - Scarboro Road - Kerr Hollow Road connection forms a continuous new north and south arterial highway through the city. The principal existing access highway from Knoxville on the south, enters the city on Scarboro Road and intersects Oak Ridge Turnpike at the geographic center of the city. The principal access road from Oliver Springs and Route 61, on the north, is Illinois Avenue which terminates at the Turnpike. It is proposed to connect these two thoroughfares with a new section of highway southwest of the new main center of the city. Although this route provides immediate access to the new main center from the north and south, it is so aligned that through traffic may by-pass the center on the west. It is also proposed eventually to relocate this highway at the north city limits to provide a better connection with Route 61. Since a portion of Scarboro Road on the south will be within the restricted area when the city is opened to the public, the new Kerr Hollow Road will form the southern portion of this highway and will connect with Solway Road to Knoxville. This new connection can be seen on the "Recreation Facilities Map." This highway also makes possible the establishment of a new through route between Knoxville and Lexington, Louisville and Cincinnati via U.S. Route 27. Because the major part of this highway will require new right-of-way, it can readily conform to the recommended standards.

It should be noted that portions of the two above-described highways may eventually be utilized as State Highway Route 61, which was relocated north and east of Oak Ridge when the reservation was first established and the area was closed to the public. With the opening of the city, an alternate city route for Route 61 could be established on Illinois Avenue and Oak Ridge Turnpike.

The third arterial highway is River Road which parallels the Clinch River and extends south from Oak Ridge Turnpike at Elza Gate to Edgemoor Gate. This highway serves traffic entering the area from the east and from U.S. Highway 25 W which provides an alternate route to Knoxville. To make this route fully effective outside of the reservation, a new bridge over the Clinch River and improvement of the existing county road from Edgemoor Gate to U.S. Route 25 W will be required. Inasmuch as there is no development along this highway within the area, adequate right-of-way can be provided as recommended.

Major Streets

These streets which carry the heavier loads of local traffic and distribute it to the arterial highways also are designed as limited-access roads, with a minimum number of intersections, and with parking and abutting development prohibited. However, right-of-way standards are somewhat reduced. They may consist of two two-land pavements with a center dividing strip of twenty feet, or a single four-land pavement. The right of way varies depending upon the type of adjoining development. Where adjoining residential developments, a ninety foot planting strip is recommended, while a minimum of thirty feet may be utilized where commercial development adjoins.

The four new major streets designated on the "Thoroughfares Map" are all south of Oak Ridge Turnpike. Two of them form the east and west boundaries of the new main business center, providing easy access to the center, but also allowing traffic to by-pass the area. The other two form the boundaries of Neighborhoods 11 and 12 and facilitate distribution of traffic in the east half of the city. These four roads, with the addition of the new arterial highway, will efficiently handle the distribution of all traffic destined for the various parts of the city entering on the south from the plants and from Knoxville. They also serve as the collectors of traffic from the secondary streets in this area. Because they are all newly proposed streets, adequate rights-of-ways can be provided. No parking is to be permitted on these streets.

Secondary Streets

These streets will handle a considerable amount of local traffic from the neighborhoods, as well as the major portion of residential bus traffic and will inter-connect the neighborhoods. A right-of-way of eighty feet is recommended. This right-of-way will accommodate four lanes of traffic or two lanes of traffic and two parking lanes and provide adequate room for

sidewalks and street trees. Parking should also be restricted and limited on these streets depending on the intensity of use. Although it may be impracticable to adhere to these standards in all cases because of topographic conditions, it is recommended that this right-of-way width be established wherever feasible. New developments and redeveloped areas should be planned accordingly, and where practicable such street lines should be established in the existing permanent development for future ultimate use.

The majority of the secondary streets shown on the plan are located in the residential area north of the Turnpike in a general north and south direction at intervals of approximately 1/2 mile. They consist of East Drive, California Avenue, Delaware Avenue, Florida Avenue, Georgia Avenue, Kentucky Avenue, New York Avenue, Pennsylvania Avenue, Jefferson Avenue, and Louisiana Avenue. Five of these streets now terminate at the Tennessee Avenue - Pennsylvania Avenue - Robertsville Road connection. It is proposed to extend them to Oak Ridge Turnpike to provide better circulation, facilitate traffic movement, and to encourage the use of the Turnpike for major cross-town traffic. It will be noted on the plan that several of these streets are extended south of the Turnpike and connected to the major streets in that area.

In addition to the above-listed streets, there are two other streets in the area north of the Turnpike which are designated as secondary streets. One is Outer Drive, which extends for six miles along the ridge at the north part of the city through the developed residential area; the other is the Tennessee - Pennsylvania - Robertsville connection, which forms a continuous mid-town route. The extension of this route eastward over California Avenue, Alabama Road, and Atlanta Road provides access to Neighborhood 1. Although both of these streets extend throughout the town for a considerable distance, residential developments about them throughout and it is not intended that they be utilized for long uninterrupted flows of traffic. Traffic controls should be installed at all intersections with other secondary or arterial highways. Two other secondary streets located south of the Turnpike are Gamble Valley Warehouse Road and Emory Valley Road which serve as the principal access to Neighborhoods 10 and 13.

When the main administration and business centers are developed, the interior streets in these areas should be established in accordance with the standards recommended for secondary streets.

Minor Streets

Because these streets will serve almost exclusively as access to dwelling units and will not carry any through moving traffic, a right-of-way of fifty feet is considered adequate in most instances. This right-of-way will provide for either two or three lanes, depending on the density of the particular development. In single family developments, where owner parking is off-street, two lanes are considered adequate. In multi-family areas, three lanes will probably be required to accommodate short time parking. The few streets of this type that carry bus lines will also require three lanes.

These streets comprise the residential roads, lanes and cul-de-sacs in the residential areas. Because of the topographic characteristics of these areas, they are mostly of short length. Only in a few instances north of the Turnpike do they extend through the neighborhoods from one secondary street to another. The more gently rolling topography in the new neighborhoods south of the Turnpike permits the development of a more usual residential street layout.

Regional Roads

Although the roads within the surrounding area are beyond the scope of the Master Plan recommendations, they are of great importance and interest to Oak Ridge and must be considered in the relationship of the city to the region. The cooperation of the county and state highway departments should be solicited in obtaining the desired regional highway connections.

Access to Oak Ridge from the north is at present via Route 61. At Oliver Springs, Route 61 continues southwestward to Harriman, while Route 62 continues northwest to Wartburg

and U.S. Route 27. An improvement of Route 62 from Wartburg to Oliver Springs would afford through traffic on U.S. Route 27 better access to Oak Ridge. Access from the east is on Route 61 from Clinton and on a county road from U.S. Route 25 W to Edgemoor Gate. Both routes need realignment and improvement. From the south, access from Knoxville is on Solway Road, an adequate highway constructed especially for this purpose during the building of Oak Ridge. Entry to Oak Ridge from the west and southwest at White Wing Gate, Gallaher Gate, and Blair Gate will be restricted to plant workers when the new restricted area and new open town policy is effected. Therefore, the following recommendations are made to facilitate access from the west and are indicated on the "Regional Map." A proposed highway from Monterey to Wartburg would enable traffic on U.S. Route 70 N to continue eastward via Routes 62 and 61 into the north part of Oak Ridge at Oliver Springs Gate, thus avoiding the congested areas at Rockwood and Harriman. A proposed highway from U.S. 70 at a point almost due north of Lenoir City to Solway Road immediately south of Solway Gate would facilitate entrance to the south part of the city from the west.

Another highway of special importance to Oak Ridge is shown on the "Regional Map." This is the proposed road from Oak Ridge to the Knoxville Airport, Alcoa, and Maryville, with connections to the Great Smoky Mountain area and points in North Carolina and Georgia, which is described below under "Airports."

BUS SYSTEM

Present

The present bus system operated by the American Industrial Transit Inc., under a contract with the city, provides the sole method of local public transportation at Oak Ridge. The system provides plant worker service from the city to the plants in the area, school bus service and a general city-wide transit service. The system operates out of a central terminal near Jackson Square, and a secondary terminal at Jefferson Center. The central terminal is also utilized by "off-area" buses providing regular through and special service to other cities. The main bus repair and storage facilities are also located at the central terminal.

The present transit system provides adequate and satisfactory service to all parts of the city. It readily may be extended into new neighborhoods as they are developed, and present routes easily may be adjusted in accordance with future population requirements in the redeveloped areas north of the Turnpike. Further, since it is a mobile system, it does not affect any land use allocations other than areas utilized for terminals, repair and storage facilities, and the pavement widths of streets utilized. The plant worker and school bus operations are also satisfactory, but they are special services not usually provided in a city system, and their future depends primarily on administrative determinations. Adequate off-area bus service is also provided at the present time.

All bus terminal buildings are of frame construction, although several of the buildings, including the Central and Jefferson passenger stations and the Central repair shop, are well built and have an estimated physical life of ten years or more. The remainder of the buildings including service and storage facilities are of a very temporary nature and will require replacement or abandonment at an early date.

Future

With the establishment of a new main business, cultural, and administrative center at the geographic center of the future city development, it will be desirable to reestablish the main bus terminal in the new business center. This building will serve as the terminal for off-area buses as well as for all local lines. The location of this building is especially important at Oak Ridge as buses are the only local public transportation link with other cities. Bus company offices also may be accommodated in this building if desired. The present repair services at Jefferson Center have been abandoned, although the Center will remain a terminal or transfer point, as will Jackson Square.

Because of the investment in bus storage and repair facilities at the present central terminal, it will be necessary to retain this area until the buildings require replacement. At

that time the major part of these activities should be relocated in the new south industrial area. Supplementary minor service and storage areas should be provided in two locations, one in the west part of the east industrial area and another in the vicinity of Jefferson Center.

The majority of streets to be utilized by buses are designated as arterial highways, major or secondary streets, and will be of adequate width to accommodate these services.

RAILROADS

General

The only railroad lines within the reservation are freight sidings which have been extended into the area for service and maintenance purposes or plant usage from the main line of the L. & N. Railroad on the east and from the branch line of the Southern Railway at the northwest corner of the area. The L. & N. Railroad connections, comprising the greater part of the trackage, enter the city near Elza Gate and extend westward through the warehouse area to the Steam Plant. They also extend in a southwest direction through the area south of Oak Ridge Turnpike, serving the construction, maintenance, and service facilities along Warehouse Road, Emory Valley Road, and Gamble Valley Road. A north and south extension from this line serves the bulk fuel storage plant along West Division Road on the north, and the Midway Warehouse and plant area on the south. The Southern Railway connection in the northwest part of the area serves the plants in that section only. These railroad facilities have been determined by the A.E.C. to be suitable and satisfactory for the handling of freight for all required city and plant purposes.

Since the Master Plan proposes the removal of all construction shops, maintenance and service activities from the areas to be developed as Neighborhoods 9, 10, 11, there will be no need for the railroad trackage west and north of a point near the intersection of Timberland Road and Midway Cut-off. Extensions beyond this point are, therefore, to be removed as this development progresses. Additional extensions are proposed along the boundaries of and within the new south industrial development to be built adjacent to the present Midway Warehouse group.

Passenger Station

The L. & N. Railroad operates five passenger trains daily in each direction between Cincinnati and Knoxville on the main line which traverses the east reservation limits. The track is on an elevated grade at its crossing of Oak Ridge Turnpike at Elza Gate. The nearest existing stations are at Dossett, northeast of the reservation and at Edgemoor at the Southeast corner of the area. While the closest and most desirable location for a possible future passenger station at Oak Ridge is in the vicinity of Oak Ridge Turnpike and the main line crossing, the existing tunnel and bridge near this point make this location impracticable. Therefore, the Edgemoor location is recommended.

The only other passenger service operating near or adjacent to the reservation is that of the Southern Railway, which operates a secondary line east from Harriman paralleling the north reservation boundary. The nearest stations are at Oliver Springs and Clinton. However, since there is only one train daily in each direction, and the nearest possible station location is immediately northeast of Dossett, it does not appear that a passenger station would be justified.

AIRPORTS

Commercial Airports

No reasonably level area of sufficient size is available within or adjacent to the reservation for the establishment of a commercial airport. Further, since adequate facilities of this type presently are provided at the Knoxville Airport, it is doubtful whether they will ever

be required at Oak Ridge. Improved means of access to the Knoxville Airport, however, should be sought, whereby the city of Knoxville could be by-passed. Although the major street plan of Knoxville includes proposed new street connections that would afford Oak Ridge traffic the opportunity of avoiding the built-up section of the city, a more direct route would be desirable. Shown on the "Regional Map" is such a proposed route. This route leaves Solway Road at a point approximately one mile south of the Clinch River, follows an existing county road for several miles, then follows a new location, crossing U.S. Routes 11 and 70 and the Fort Loudon Reservoir at a point east of Concord Park and continues directly to a connection with Route 73 near Alcoa. This entire route is outside of the reservation and would have to be built as part of the county or state highway systems.

Other Airports

At present there are two small airports located immediately outside of the reservation on the north and east, operating for the convenience of private plane owners. If this activity should become more popular, and it is determined desirable or feasible to accommodate such use within the area, there are several locations within the greenbelt area surrounding the city that could be utilized for such purposes.

There also is ample area just south of the new main center of the city to accommodate landing space required for helicopters, if such service ever need be accommodated.

UTILITIES

The source and supply of water and power and the feasibility of providing other utility services had been determined prior to the initial building of the city. With the decision to rebuild permanently at Oak Ridge, it was necessary to analyze the existing utility facilities to determine their quality, condition, capacities, adequacy, and adaptability to extension.

A survey and analysis of the existing water supply, sewerage, sewage disposal, electric power, and central heating facilities were made and reported in detail in the Phase "B" Master Plan report. From this survey it was determined that with certain required improvements, the existing systems would be adequate and could be practicably extended to serve the contemplated future population.

The areas into which these services could be economically extended were largely determined by topography, which was also the most instrumental factor in the location of the newly proposed developments. Having determined that these developments could be served by utilities, the layouts of the proposed utility systems were then determined in a large degree by the street pattern.

The existing and proposed water, sanitary sewer, and electric distribution systems are shown on the three accompanying maps. They are described in the following text along with several other utility services.

WATER DISTRIBUTION SYSTEM

The existing water distribution system was studied in detail in connection with the Phase "B" Report and with respect to its adequacy for full occupancy of the structures existing at that time, including unoccupied dormitory buildings, or a total population of about 46,600. In connection with this phase of the report, the studies have been brought up to date for an ultimate population of about 50,000 and for the development and occupancy of the new neighborhoods as proposed in the Master Plan. These findings are summarized as follows:

Quantities

For a total population of 50,000, the yearly average water requirement is estimated at 140.0 gallons per capita per day, or 7.0 MGD, with a maximum day at 1.6 times the average, or 11.2 MGD. It is also assumed that fire flows up to 7,500 gallons per minute for a ten-hour period must be available in addition to other uses at the maximum daily rate.

Supply Works

The raw water pumping station and supply mains, with a capacity of 23.0 to 25.0 MGD, are adequate to supply the city's needs, plus other uses up to about 12.0 MGD if desired. Similarly, the filter plant can probably produce at all times about 9.0 MGD more than will be needed for the city. Unless greater quantities than these will be needed elsewhere, the supply works are considered to be of adequate capacity.

Transmission Mains

The mains which carry filtered water to the city, consisting of the existing 12-inch and 16-inch mains plus the new 30-inch main about to be constructed, are believed to be entirely adequate for the ultimate needs of the proposed city development. These mains should be tied together with several new inter-connections.

Distribution System

The Phase "B" Report indicated some deficiencies in the distribution system regarding fire flow to certain areas. Also, portions of the system were not secure regarding continuity of service in case of breaks. The new 30-inch main and its extensions now planned for early construction will take care of the major deficiencies in fire flow in the central area of the city. Additional mains to the east warehouse area still are needed. Except for these items,

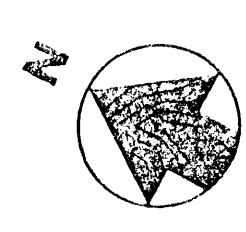
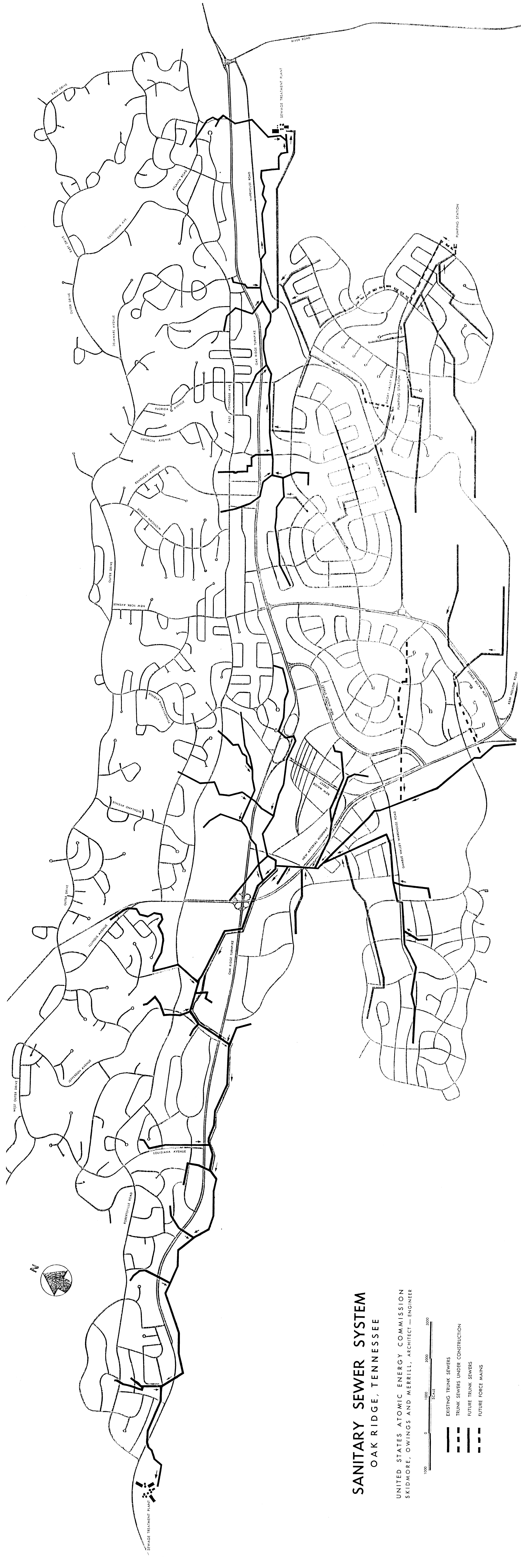


WATER DISTRIBUTION SYSTEM OAK RIDGE, TENNESSEE

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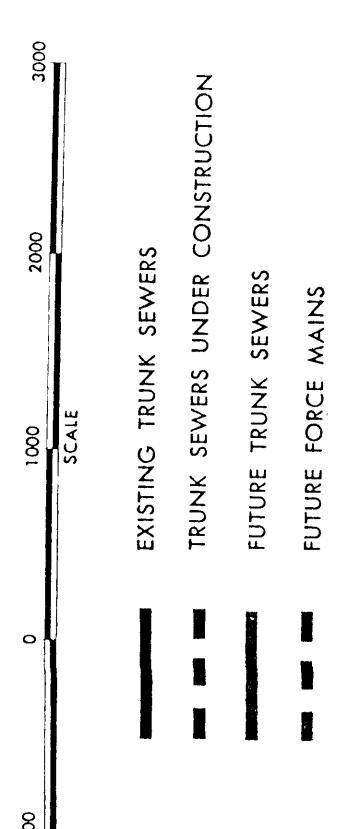


- EXISTING TRUNK MAINS
- TRUNK MAINS UNDER CONSTRUCTION
- FUTURE TRUNK MAINS



SANITARY SEWER SYSTEM OAK RIDGE, TENNESSEE

UNITED STATES ATOMIC ENERGY COMMISSION
SKIDMORE, OWINGS AND MERRILL, ARCHITECT — ENGINEER



the improvements that should be made in the existing system are of minor extent.

The storage reservoirs and booster stations are believed to be adequate for the proposed development.

The proposed new neighborhoods can be well served from the three filtered water supply mains and through inter-connections with other principal mains of the system. Sufficient trunk mains should be provided into and within each neighborhood to take care of maximum demands for normal uses and fire protection. These mains should be of liberal capacity to allow for the possibility that one or another of them may be out of service.

Although detailed design studies have not been made, it appears that 12 inches may be the proper size for most of the future mains into the individual neighborhoods, and that the mains extending eastward to serve the present and proposed industrial areas perhaps should be 16 inches in diameter.

The "Water Distribution System Map" shows in black the existing mains 8 inches and larger and those now under construction or about to be built. Shown in red are suggested approximate locations of new mains to be built as needed. The mains shown in red include not only those to provide water service into the new neighborhoods, but also suggested additions to the present system to correct most of the more important deficiencies.

SEWERAGE AND SEWAGE DISPOSAL SYSTEM

Sewage Quantities

Application of the unit quantities of sewage, per capita and per acre, used in the Phase "B" Report, to the development now proposed in the Master Plan results in some increase in total sewage quantities to the easterly and westerly systems. The estimated yearly average quantity for the easterly system is increased from 2.15 MGD to 3.04 MGD, and for the westerly system, from 4.37 MGD to 4.97 MGD.

Peak flows for sewer design have been estimated in the same ratios to the average flow as used in the Phase "B" Report.

Sewage Characteristics

It is assumed that there will be no important differences in sewage characteristics.

Degree of Treatment

The matter of degree of treatment was discussed in the Phase "B" Report, and it is assumed that there have been no changes in the underlying considerations.

Collecting System

The "Sanitary Sewer System Map" shows the principal existing sewers, suggested approximate locations of trunk sewers to serve the proposed new neighborhoods, and certain relief sewers computed to be necessary where existing lines may be inadequate for future loads.

Little information is available as to the quantities of sewage that will be tributary from the Y-12 area. Present analysis of trunk sewer capacities has allowed 0.5 MGD average flow and 2.4 MGD maximum rate of flow of sewage from this area. The relief sewer shown parallel to a considerable portion of the westerly trunk line is that computed to be necessary on this basis. If the peak rate of flow tributary from the Y-12 area is around 2.0 MGD higher than the quantity used in the study, some additional length of relief sewer will be necessary.

Although detailed design studies have not been made, it appears that the main outlet sewer to the easterly plant should be paralleled for some distance by a relief sewer about 21 inches in diameter, and that the relief sewer parallel to the westerly trunk line should be perhaps 24 inches in diameter. Additional trunk sewers serving individual areas probably will not be more than 15 to 18 inches in diameter.

For the southeasterly neighborhoods, a considerable part of the drainage is to the south-east and the need for pumping stations is indicated. These stations and their force mains to

deliver sewage to gravity lines that will flow toward the treatment works are shown on the map.

Treatment Plants

The Phase "B" Report indicated that the easterly treatment plant was generally adequate to treat the sewage assumed to be tributary thereto. With the proposed development, the loads on the treatment plant will be 35 to 40 per cent higher than assumed at that time. Even so, it is believed that the existing plant will be capable of producing an acceptable effluent without major extensions or additions, and that the modifications necessary will be principally those needed to increase the hydraulic capacity to reduce the frequency of by-passing of occasional high rates of flow.

The loads on the westerly plant will not be much different from those assumed at the assumed at the time of the Phase "B" Report. Although the estimated quantity of sewage is about 15 per cent higher, the estimated population loading is about 5 per cent lower. It is believed that this plant is capable of providing acceptable primary treatment. Here, as with the easterly plant, some improvements should be made to increase the hydraulic capacity.

ELECTRIC POWER

The adequacy of the existing power supply system to serve the present load and contemplated future growth has been studied and reported as part of Phase "B" Report. The system is adequate in capacity to serve an estimated future population of 50,000.

Power is supplied by a loop in one of the 154 KV transmission lines of the TVA system. The loop terminates in a sub-station known as Elza # 1, which contains three 15,000 KVA three-phase sixty-cycle 154/13.8 KV transformers. The 13.8 KV secondary sides of these transformers supply, through metal-clad distribution switchgear, twelve three-phase four-wire feeders, ten of which now serve the city.

The sub-station equipment is properly segmented and is designed for supplying flexible and continuous service. There is provided every modern device for safety and high quality power supply except voltage regulators.

Ten feeders presently serving the city leave the sub-station below ground and run to terminal poles near the sub-station building. From these poles, the feeders are aerial to the city and the present distribution in the city is overhead.

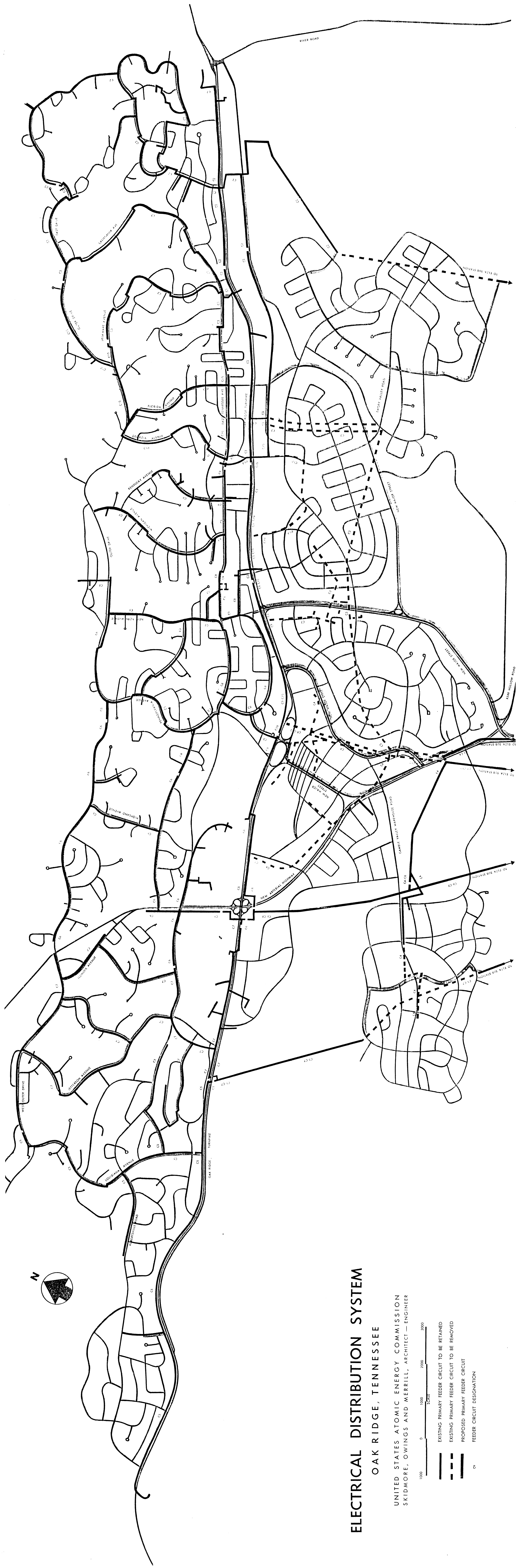
Where the present feeders cross or are in close proximity to each other, switches are provided so that any feeder may be served by an adjacent feeder or group of feeders in the case of emergency.

Street lighting is a multiple system controlled by pilot wire relays from a central point. The lamps are supplied from the secondary mains of the regular distribution system.

Where the present feeders pass through areas to be developed for new housing and commercial centers, they will be rerouted to pass along main roads through or around these areas as shown on the "Electrical Distribution System Map." Transformers to serve new residential areas will be located on poles carrying the primary feeders, adjacent to the principal roads, or on poles served by only short branches from the primary feeders. The overhead distribution within new residential areas, therefore, will consist principally of secondary and street lighting conductors carried on poles.

In the new business center south of Oak Ridge Turnpike, the electric distribution system should be underground, consisting of a secondary network supplied from subway type transformers. These transformers should be connected to alternate separate feeders. The several divisions of the secondary network should be sectionalized, connected by current-limiting devices. The transformers should be connected to and disconnected from the secondary busses automatically by devices actuated under influence of the voltage impressed on the secondary network, between limits of plus or minus two volts. Street lighting in the new business center should be a series system, employing pedestal luminaires of harmonious design, and underground cables.

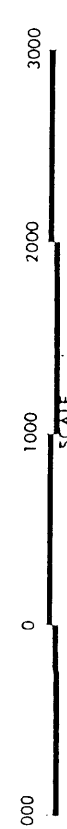
As a concomitant to the reconstruction of the primary feeders through the new building



ELECTRICAL DISTRIBUTION SYSTEM

OAK RIDGE, TENNESSEE

UNITED STATES ATOMIC ENERGY COMMISSION
SKIDMORE, OWINGS AND MERRILL, ARCHITECT — ENGINEER



- EXISTING PRIMARY FEEDER CIRCUIT TO BE RETAINED
- EXISTING PRIMARY FEEDER CIRCUIT TO BE REMOVED
- PROPOSED PRIMARY FEEDER CIRCUIT
- FEEDER CIRCUIT DESIGNATION

areas, step-type voltage regulators will be added in the sub-station for adjusting supply voltage in proportion to the load on the several feeders. Voltage fluctuation limits of plus or minus 3-1/2 per cent from normal may be expected from this addition, to equal that of commercial standards.

CENTRAL HEATING

The ability of the present central heating system to serve its connected load and possible additions has been investigated. In the Phase "B" Report, the results of this investigation were disclosed to be:

1. The present central heating system has the capacity to serve its present connected load but not to serve any major extension of the load.
2. The effective capacity of the present system may be increased by improving the operating efficiency of the central boiler plant. Physical improvements to the system were recommended to reduce fuel and labor costs and to increase efficiency and effectiveness of the system.

Conclusion 1 precludes the possibility of serving the heating load of the new commercial center by the present central heating plant, even if it were practical to pipe steam the great distance between the central boiler plant and the load.

Consideration has been given to the construction of a separate central heating plant for the new business center, located in close proximity to the load. However, in anticipation of the supply of natural gas to the city, which can be burned efficiently in a large number of small, local heating plants without the nuisances of smoke and air pollution common to other fuels, it is contemplated that individual heating plants, of a type that can burn gas as fuel, will be provided for each building.

The improvements suggested in Conclusion 2 may best be implemented from operating funds rather than from funds for new construction work.

STORM DRAINAGE

The major part of the storm drainage system at Oak Ridge is above ground, and is an outstanding example of the economy of the utilization of natural drainage channels. Generally, it is of good appearance. The utility of certain sections could be improved by changes in alignment and adjustment of grades. Some improvement in the design of drainage structures, use of building materials, and the planting of banks would also improve its appearance.

It is recommended that in the redevelopment and new planning that the present method be utilized whenever open water courses are not objectionable. However, where natural drainage interferes with the intended use of the land, where open channels create erosion or unsafe conditions, where satisfactory grades, alignments and curves are impossible to attain above ground, and in the more intensely developed areas, it is recommended that storm sewers be installed.

TELEPHONE

The Master Plan is concerned with this utility because of its effect on city appearance. The greater part of the system consists of unsightly overhead installations. If economically feasible the system should be placed underground. Where this cannot be accomplished, joint use of poles provided for electric power should be encouraged. These poles should be located where they will least detract in appearance and at the outer edge right-of-ways on main highways.

GAS

At the present time gas is not available at Oak Ridge. However, it is contemplated that natural gas may be obtained for city-wide use in the near future. The system would require

the installation of both feeder and service mains along streets. If possible distribution mains should be located in the planting space near the curb or under the sidewalk in residential sections. Transmission mains should be located at the outer edge of the street right-of-way on the major thoroughfares. The storage facilities, if required, and headquarters for the system should be located in one of the industrial areas, preferably the south area where ample space has been reserved for such possible use. The location will, however, depend largely on the point of entry into the city of the gas supply.

SPECIAL FACILITIES AND USES

There are a number of special and miscellaneous land uses, which do not fall into any of the general classifications described in the previous sections, but yet are of sufficient importance to be considered in the Master Plan. These uses are described as follows:

CHURCHES

The two churches provided under the war emergency construction program for the religious activities of the city, together with five existing church buildings, are completely inadequate for these purposes. Of these seven temporary church buildings, three have an estimated physical life of ten years, while the remaining four have an extremely limited physical life. Outside of these buildings, all other church activities are dependent upon the use of theatres, schools, and recreation buildings.

The Atomic Energy Commission recently announced that government-owned land at Oak Ridge may be used for sites for the construction of churches or church schools by religious organizations on a long-term basis. Immediately following this announcement, meetings were held by the City Administration with the religious groups to discuss the choice and location of sites for churches throughout the city. It was agreed that definite assignment of locations would be deferred until the "Preliminary Master Plan" had been prepared and approved. A map would then be prepared showing all available sites in the city, both in the main center and in the neighborhoods. Since that time, the "Preliminary Master Plan" was approved and the map showing available sites was prepared. The City Management has been meeting with church officials and negotiating the choice of sites, recognizing previous Army commitments wherever possible. The locations of the sites selected for churches are shown on the "General Development Plan."

In consideration of church sites for the city, there were two types of churches to be considered: (1) the church serving the entire city and (2) the church serving a congregation limited to a particular portion of the city.

For the first group, in which one church serves the entire community, it is recommended that these sites be centrally located for convenience and accessibility, in an area large enough to provide adequate land and settings for the buildings and ample parking space. Preferably, they should be located in a group adjacent to the main center, or on sites adjacent to the secondary centers, where other city and community social and cultural activities are located, and where adequate transportation and parking facilities will already have been provided. For the second group, a location adjacent to neighborhood centers is recommended.

CEMETERIES

Although there has been little need for a cemetery up to the present time, the determination to make Oak Ridge a permanent city warrants the establishment of a cemetery or cemeteries.

In reviewing the possibilities of location, it was determined: (1) that it was not feasible to utilize any of the ridges surrounding the town because of the difficulties and expense encountered in road construction and plot layout, and because of the restricted amount of land available thereon; (2) that no suitable sites are available within the city area, except an area west of Louisiana Avenue and south of Oak Ridge Turnpike; and (3) all other available sites are west of the present Oak Ridge city limits along Oak Ridge Turnpike in Roane County, or in Emory Valley, or to the south in Union or Bethel Valleys.

The determination to establish one cemetery or several will depend upon the extent of cooperation which may be obtained between religious groups. Present indications are that this cooperation may be such that one area may be dedicated for use by all denominations. In either event, the site recommended is in the area on the north side of Union Valley Road, near River Road, where a sufficient amount of attractive, wooded, well-drained land prob-

ably will not be required for other purposes. This area is within the greenbelt surrounding the city and is shown on the "Recreation Facilities Map."

CLUBS AND MEETING HALLS

In established communities, these activities generally are located in second or third floor space in commercial districts or in old remodeled residences. Since neither type of space is available in Oak Ridge, clubs and organizations have located in various types of buildings originally provided for other purposes. In the future these uses should be accommodated in the main or secondary business centers, either over stores or in special buildings designed for these particular uses.

HOSPITAL

Because of the present investment in this group of buildings, and because of its central location, it is recommended that the hospital be retained in the same location in the permanent city. It was determined that ample area could be made available for any future required expansion at this site.

LIBRARY

The Oak Ridge Library Board has recommended a new city library to be located in the main center of the city, convenient to large numbers of pedestrians. Also recommended was a separation of the library building from other community buildings, with which recommendations it is concurred. Ample area has been provided in the main center for this building.

Although no recommendations were made concerning branch libraries, if it is determined at a later date that these are desired, they should be located in the secondary business or neighborhood centers.

POST OFFICE

The main post office, now located at Jackson Square, should be relocated in the new main business center. If considered desirable by the postal authorities, the present space at Jackson Square may be retained as a branch post office for the east neighborhoods. A branch post office could be established at Jefferson Center for the west neighborhoods, to replace the existing branch at Grove Center when this development ultimately is abandoned.

FIRE HOUSES

Fire houses should be distributed throughout the city in a number determined necessary by the authorities in charge of fire protection. They should be located at secondary business or neighborhood centers. The Number 1 Company and central office should be located near or in the main center of the city.

A. E. C. PERIMETER PATROL

The offices and headquarters of the patrol are presently located in Lafayette Hall, which is generally suitable in size, with the exception of office space, which is slightly inadequate. However, since the building was not designed for its present purpose, there are deficiencies in plan that affect its use.

The main activity of the patrol is of a classified nature, requiring fireproof storage space. The patrol also is entrusted with the physical security of the entire area. Therefore, a fireproof building or vaults are a prerequisite in a permanent location. The building

should be centrally located for protection of the entire area, but not in a congested or residential area. Since it is anticipated that eventually this activity will be removed from its present location, it is recommended that it be relocated either on Oak Ridge Turnpike at the west edge of the city or in the vicinity of the Scarboro School Building.

A. E. C. AND STATE LICENSE BUILDING

These activities are presently located in a building on East Division Road. It is recommended that the two license operations be kept together and consolidated with the safety lane activities in one building. The building should be located outside of any central congested area, but readily accessible from a traffic standpoint.

NATIONAL GUARD

This organization is presently located in the former dormitory, Lafayette Hall. The present floor space is close to adequate for their purposes except for drill floor space and future equipment storage. This activity usually is accommodated in an Armory Building, which has been recommended by the local authorities concerned. Future plans for the National Guard at Oak Ridge includes the establishment of: (1) one battalion (530 men), office space, supply rooms, drill floor, training room, and locker space for this number, and (2) storage for a full complement of 72 vehicles.

If the usual agreement between the Federal Government, State, and City can be made wherein each contributes one-third of the cost of an armory, the facilities could be utilized for various community activities. National Guard activities are normally restricted to one night a week. It has been suggested that perhaps club room and meeting space for veteran organizations might be located in this building if feasible. It is recommended that the building be located adjacent to the main center of the city.

CITY APPEARANCE

The preceding sections have dealt with the functional design elements of the Master Plan. They have described the means of creating good living conditions at Oak Ridge. It is not enough, however, that the city be efficient, safe, and convenient. It should also be pleasing in appearance if it is truly to be a desirable and attractive place in which to live and work.

Beauty and attractiveness are elements that should be incorporated into the design of every phase of planning and building the city. They should not be considered subordinate to construction programs, but rather a part of them. They should not be overlooked or postponed until the utilitarian aspects of the plan have been accomplished. With few exceptions they may not be applied as an after-thought.

At Oak Ridge there is an unparalleled opportunity to create an attractive city. Oak Ridge is located in a beautiful natural setting of wooded hills from which there are fine views of the near-by mountains. It is a new city, much of which is of temporary construction and which has to be rebuilt. It is also owned by a single agency, which makes it possible to establish good design standards to be applied to all land and building development, whether built by the government or by private enterprise. Even though the A.E.C. leases or sells land, as presently contemplated, measures of control can be incorporated into these contracts that will require compliance with good design standards.

PRINCIPAL ELEMENTS

Other than topography and the natural beauty of the site, the principal elements of design in the appearance of the city are its orderliness; its architecture, both public and private; its open spaces, parks, recreation areas, and streets; the preservation of its natural landscape and setting; and the planting of trees, shrubs, and lawns.

Order

Orderliness is a part of a city's attractiveness. It will be created in great part by the harmonious arrangement of all of the various buildings and land uses comprising the city, as proposed in the Master Plan. The proper location for each specific use in the city has been designated in the plan. In the south part of the city, especially, there are many instances of a confused jumble of business, service and maintenance, industrial, and dwelling uses. The elimination of these conditions will go far toward creating the desired orderliness of the city. The application of the restrictions imposed by the zoning ordinance and other contemplated controls also will aid in effecting land-use harmony and order. They will prevent haphazard building, create a certain uniformity of building location and spacing, and insure orderly future expansion. But along these plans and controls will not effect the complete orderliness that is desired. They will have to be augmented by the establishment and application of good design standards to all of the elements of urban development, including dwellings, streets and their appurtenances, open spaces, public structures, and facilities for essential services.

Architecture

Probably no other element contributes so much to the appearance of the city as its architecture. The future character of the city in a large measure will be determined by the type of individual buildings that are built at Oak Ridge, including public as well as private, commercial, and industrial as well as residential.

The architectural attractiveness generally lacking in most cities is not entirely the fault of the architects who designed the buildings, but is primarily due to general architectural disunity resulting from the erection of buildings of different style, color, size, shape, and building material, without any relation to each other.

Improved architectural effect and more unified design can be attained by the grouping of buildings that have similar functions. Careful composition of buildings with respect to

height, form, and mass and the use of harmonious materials are means of design that may be utilized to achieve pleasant architectural character. The particular style of architecture to be utilized always should be appropriate to its function and should harmonize with the surrounding development.

The public buildings group and the main business center offer the greatest opportunity the city has to make evident its appreciation of orderliness and beauty. With the proper architectural and landscape architectural treatment these buildings will be a source of pride to the entire city and provide the inspiration that will influence the individual residential, business, and industrial development.

Architectural Control

Although the architectural design of individual buildings is beyond the scope of the Master Plan, the importance of securing and maintaining a high standard of design in these structures cannot be overemphasized. This will be especially important if the land, now held in public ownership, is sold or leased on a long-term basis. Property values may be bolstered or destroyed depending on the architectural character of the buildings in the vicinity.

Architectural control in a few instances has been incorporated into municipal zoning ordinances as a public act. Architectural boards of control also have been established in cities from time to time, but these methods of control have had to depend largely on the voluntary cooperation of owners, architects, and builders, as the courts generally have not yet sanctioned the use of the police power to enforce aesthetic considerations.

The simplest, surest, and most logical method at this date of achieving the desired control is through deed or lease restrictions, which may specify that the approval of an architectural board is required prior to the issuance of a building permit. Through the use of this method the controls become part of a private agreement or contract between two parties, and as such are enforceable by law.

In recognition of the desirability of control of building architecture, the A.E.C. has recently created an Architectural Control Board consisting of three members, to review the design of all buildings to be erected at Oak Ridge. Approval of this board has been made a prerequisite to the issuance of authority by the A.E.C. to private builders for any building construction. The value of this board has already been demonstrated, as the design of several proposed structures has been greatly improved by the suggestions and advice offered by the Board to the builders. It is recommended that this Architectural Board be continued in effect as long as the A.E.C. owns and controls all of Oak Ridge. It is further recommended that if deed and lease restrictions are utilized by the A.E.C. in connection with the sale or lease of land, they include mandatory approval of this Board of all architectural design, for all private construction. Also, in the dedication of land for public use, that approval of the Board be required in connection with all public buildings erected at Oak Ridge.

It should be emphasized that the architectural control recommended here is not in any way intended to be restrictive. It is intended and designed to protect prospective builders and property owners. High standards of architectural design will stabilize and protect investments in land and buildings, and create harmony in the city's appearance.

Streets

Because streets occupy such a large portion of the total city area, serve as access to and provide the setting for all buildings, it is important that they be attractive as well as functional.

They must be not only of generous or adequate width, to accommodate anticipated traffic, but must include sufficient land so that sidewalks, grass strips, and street trees may be properly and pleasingly located and that the ground form of these areas may be carefully blended into that of the adjoining properties. Careful attention also must be given to the engineering design of pavements, curbs, sidewalks, intersections, street curves, and profiles so that pleasing effects as well as efficiency are obtained.

Other factors that affect street appearance are its appurtenances, such as street signs, light standards, traffic signals, poles and wires, and street trees. Uniform, well-designed light standards and street signs of a character that would add to the attractiveness of the city should be utilized. Street signs should be placed so that they will be illuminated by the street lights at night. Standard traffic control devices also should be used uniformly throughout the city. Perhaps no other item detracts so much from the city's appearance as street poles and wires. Every attempt should be made to eliminate overhead wires. Where they cannot be placed underground, they should be located where they least detract from appearance and best preserve native tree growth whether along streets or on easements at the rear of lots. The proper location will be determined by the site plan of the individual development. The planting of street trees should be considered a part of all street improvement projects. Properly chosen and maintained street trees add considerable attractiveness to any street. The value of street trees as well as other community planting is described in more detail later in this section.

There are also several other street uses that usually are a detriment to good appearance. Those are; sidewalk obstructions, including the display and storage of merchandise, and the placing of removable signs on sidewalks in business districts; overhanging and projecting signs in business districts and advertising bill boards on street rights-of-way. Fortunately at Oak Ridge, none of these uses has been permitted and the appearances of streets is infinitely better therefore. Provisions included in the proposed zoning ordinance restrict and regulate the future uses of billboards and overhanging signs, but control over sidewalk obstructions must be included in future municipal city regulations if the present uncluttered appearance of the business district of the city is to be retained.

Last, but not least in importance, is the matter of cleanliness and maintenance, a prime requisite for attractive streets. Although the city has an obligation to maintain streets in a clean manner, the aid and cooperation of citizens will greatly facilitate this undertaking. Receptacles for waste paper and rubbish should be provided in sufficient number in all areas of concentrated use.

The above-recommended design controls should be established by the A.E.C. Public Works and Engineering Department for all immediate development. In the event of future incorporation of the city, such design standards should be set up by the City Engineering Department.

Other Municipal Physical Improvements

Other physical improvements now controlled or being constructed by the A.E.C. or their designated representatives, which have a marked effect on the city's appearance are public parking areas, retaining walls, storm drainage structures, individual carports or parking spaces, dwelling entrance walks, steps and service facilities, and fences. Although the public parking areas generally have been well designed, the appearance of storm drainage structures, retaining walls, and dwelling walks and steps should be improved by better design and choice of building materials. While individual initiative is desirable and should be fostered, the design and construction of individual carports or turn-outs and fences should be more rigidly controlled. In many instances these facilities have been designed and located so improperly and poorly that they detract greatly from the appearance of the surrounding development. Because the rugged topography at Oak Ridge creates unusually difficult problems in the location and design of many of these facilities, there is all the more need for the control of their construction. The skillful adaptation of good design standards will be required. It is recommended that such standards be adopted and made applicable whether these facilities are built by the A.E.C. or by individuals. It also is recommended that the standards be submitted to the Architectural Board of Control for approval before adoption.

Another municipal facility which at present seriously mars the city's appearance is the overhead steam system in the Jackson Square Area. Not until this system is relocated underground can this area be made attractive.

Preservation of Natural Resources

Oak Ridge has the advantage of an unusually attractive setting. The natural features of the site also have been preserved for the most part in the existing city development. In the redevelopment and new building contemplated, these natural features should be consistently and zealously preserved and cultivated.

The general site design of the residential neighborhoods was carefully adjusted to the terrain, leaving the natural drainage channels and bordering woods and the more rugged hillsides in an undeveloped state. The result is an uncrowded, well-spaced residential development interspersed with attractive open areas. It is this openness of development that makes the city unique and gives it attractive individuality.

In general the existing development was constructed with due regard for the preservation of the natural resources of the site. Streets and houses were adjusted to the topography, avoiding excessive cuts and fills and the destruction of existing native tree and shrub growth wherever possible. The native growth in the open areas was also undisturbed for the most part. However, as in most war-time construction, because of the speed required and the limitations of funds, little attention was given to the details of good finished grading or to the preservation of native ground cover. The results are all too evident. Borrow pits left ugly unplanted land scars in many parts of the city and area. Unfinished street grading left steep unplanted banks that do not blend into the adjoining ground forms. There also are numerous other individual examples of the unattractiveness resultant from the postponement of this refinement of development. It should be noted, however, that in the period since the original construction of the city noticeable and creditable efforts have been made within the city to correct many of these unattractive scars, through regrading and the planting of lawns.

In the area surrounding the city, there are also evidences of the hurried construction program, consisting mainly of denuded borrow pits and roadside banks. Fortunately, however, little of the native tree and shrub growth in the area has been disturbed. The A.E.C. also wisely has controlled the use of these areas, restricting them to farming and experimental agricultural purposes. No other private use of the area has been permitted. With the exception of the above-mentioned evidences of construction, and the areas where soil erosion has occurred unchecked over a period of years, the rest of the area, including the attractive water front along the Clinch River, remains unspoiled and attractive in its native state. Mention should also be made of the efforts currently being made to erase the construction scars and to check erosion in the area by the planting of seedlings in an organized reforestation program. The following recommendations are directed to the future continued protection and preservation of the natural assets and openness of development of both the city and surrounding area.

Control of the greenbelt area surrounding the city should be continued under the present regulations exercised by the A.E.C. In the event of the future renting, lease, or sale of any of this area, however, the contemplated use should be in accordance with the uses and regulations prescribed for the Forestry-Agricultural-Recreation District in the proposed Zoning Ordinance. Under these regulations the density of land development in these areas is greatly restricted as are the uses permitted. The permitted uses include single-family dwellings on five-acre plots or more, general agricultural operations, and recreational facilities. It is intended that these limitations will insure the preservation of the openness and attractiveness of the area, preserve the present unspoiled and attractive highway approaches to the city by prohibiting billboards and commercial uses, and provide the means of controlling city expansion. They may be effected either through incorporation into rental agreements or deed restrictions, or by the use of the Zoning Ordinance, depending upon the method of control ultimately determined most desirable at Oak Ridge. In addition to these limitations, it is contemplated that certain portions of these areas will be protected and preserved through their reservation for recreation purposes as recommended in the proposed recreation system for the city.

It should be noted that while the proposed greenbelt will adequately prevent fringe development on the north, west, and south of the city, because of the close proximity of the

city development to the east reservation boundary, additional control may be required. This might be accomplished through the joint efforts of the Oak Ridge, Clinton, and Norris Planning Commissions cooperating in matters of common interest, such as the improvement of regional highways and the development thereon, or by the inclusion of the immediately adjacent area into the incorporated city.

The protection and the preservation of the natural resources of the area, as well as the reforestation, regarding, and planting of construction scars and eroded banks and gullies should be continued. It is recommended that this be done under the direction of well-qualified forestry and landscape architectural personnel employed as full-time employees by the A.E.C. or the municipality, in the event of incorporation of the city.

The protection and development of the natural resources within the city, in the open areas between residential developments, along natural drainage channels, and in areas reserved for recreational activities, as well as throughout the city, should also be entrusted to the forestry and landscape architectural personnel recommended above.

New Planting

A comparison of the areas where native tree growth existed and was conserved, with the areas barren of trees clearly illustrates the desirability and attractiveness of planting. It also illustrates the incentive provided by trees to the planting of shrubs and improvement of lawns, as most of the attractively landscaped residences are in these areas.

The general effect to be obtained by the conservation of native growth and the new planting of trees, shrubs, and ground cover throughout the city is that it will appear that development has been accomplished without disturbing the existing natural landscape. It follows that the new planting should be of native type that will blend in with existing growth.

The city will not appear completely attractive until all streets, public buildings and areas, and private residences are appropriately planted. Of these, the street tree planting is the most important because it is the most general and will have the greatest effect on the appearance of the city. Street trees should be planted in an informal natural arrangement for the most part. Formal plantings may be made in certain areas such as business districts and at certain public buildings to emphasize their importance. Street trees should be selected for their appearance, hardiness, adaptability to limited food and water supply, and amount of shade given. Since it takes a period of years for street tree planting to become effective, a long-term program of planting should be adopted at an early date and consistently carried out. It should be a part of the street improvement program and carried out by the A.E.C. or the municipality under the direction of forestry and landscape personnel.

The proper planting of public properties and buildings, including parks, and the grounds around schools, A.E.C. and City Administration buildings, and other public buildings will make a great aesthetic contribution to the appearance of the city. The planting should be of simple design, easy to maintain, and of indigenous plant material. This planting should also be carried out by the A.E.C. or the municipality.

Other plantings that will be government or city functions are soil erosion and ground cover plantings in the open hillside areas throughout the city.

In the normal city, the planting and maintenance of individual home grounds is entirely a matter of private initiative. At Oak Ridge, at least until such time as homes are leased or sold, the government has an interest in the development and appearance of the grounds around dwellings, apartments, and dormitories. At the present time, the A.E.C. is providing top-soil and seed to tenants for use on home grounds, but plant materials are not furnished. While pleasing planting effects have been obtained in many instances, it has been at the cost of the occupant. It is believed that, as long as the government retains ownership of the dwellings, the basic grading and planting incident to complete development and good appearance is a government function. There is ample precedent for this practice, both in private and government rental housing. The planting either could be done entirely by the A.E.C. or in conjunction with the tenant under the direction of qualified A.E.C. landscape

personnel. Plant materials either could be purchased on the open market, contracted for, or furnished from a government or city nursery. Tenants should be encouraged to assume responsibility for maintenance, although the government should provide technical assistance and general supervision. The planting and maintenance of apartment buildings and dormitory buildings grounds is necessarily the responsibility of the building owner, whether the government or an individual.

APPENDIX

APPENDIX NO. 1

A TABULATION INDICATING THE TOTAL NUMBER OF EXISTING HOUSES BY TYPE AND
THE TOTAL NUMBER OF PEOPLE ASSIGNED TO EACH TYPE
AS OF NOVEMBER 30, 1947

Type Units	No. of Houses	No. Units Occupied as of Nov. 30, 1947	Estimated No. Occupants Per House	Estimated No. of Occupants as of Nov. 30, 1947
Single Houses (Cemesto)				
A	700	693	3.16	2,190
B	800	789	3.40	2,683
C	400	397	4.68	1,858
D	447	431	4.03	1,737
F	53	51	5.03	257
G	40	40	3.81	152
H	10	10	6.25	63
Single Houses (Prefabricated)				
T.V.A. A-6	500	498	2.33	1,156
T.V.A. B-1	1,621	1,605	3.63	5,826
T.V.A. C-1	500	498	5.37	2,674
S	274	272	2.49	677
V	470	461	3.70	1,706
Multiple Houses (Cemesto)				
E	150 (4 units each)			
	300 E-1's	297	2.13	632
	300 E-2's	292	2.98	870
Multiple Houses (Wood)				
K	50 (4 units each)	197	2.89	569
L	60 (2 units each)	119	3.49	415
N	15 (12 units each)	178	2.29	408
Multiple Houses Either Wood Siding or Asbestos Shingles				
T	190 (2 units each)	380	4.71	1,790
U	60 (2 units each)	119	3.70	440
Multiple Houses (Prefabricated)				
VC	239 (2 units each)	381	2.80	1,070
VC	1	1		
TDU	477 (140 - 1 BR)	139	2.44	339
	(680 - 2 BR)	673	3.91	2,631
	(150 - 3 BR)	150	5.82	873
				31,016

APPENDIX NO. 1 (Continued)

Type Units	No. of Houses	No. Units Occupied as of Nov. 30, 1947	Estimated No. Occupants Per House	Estimated No. of Occupants as of Nov. 30, 1947
Efficiency Apartments				
Type - 1	2 (24 units each)	47	2.22	104
Type - 2	(65 units each)	62	2.08	129
Dormitory Apartments				
H	4 (20 units each)	71	2.73	194
S	1 (42 units each)	30	2.13	64
				491
Dormitories				
H	42	11	137	1,507
S	43	7	122	855
				2,362
Colored Hutment Area	Space Authorized	Space Occupied		Population
Huts, Colored (4 men)	432	289		289
(4 women)	376	128		128
Family Apartments	101	101		215
Victory Homes	260	259		605
				1,237
Midtown				
Trailers, Private	64	48		110
Huts, Apartments	52	51		178
				288
J. A. Jones (K-25)				
Victory Homes	100	75		213
				1,738
TOTAL POPULATION				35,607

Note: Information from a survey made during 1947 of 6,180 housing applications by Control Section - City Management Division, A. E. C. and Status of Trailers, Huts and Barracks - November 30, 1947 - Personnel Statistics Branch - A. E. C.

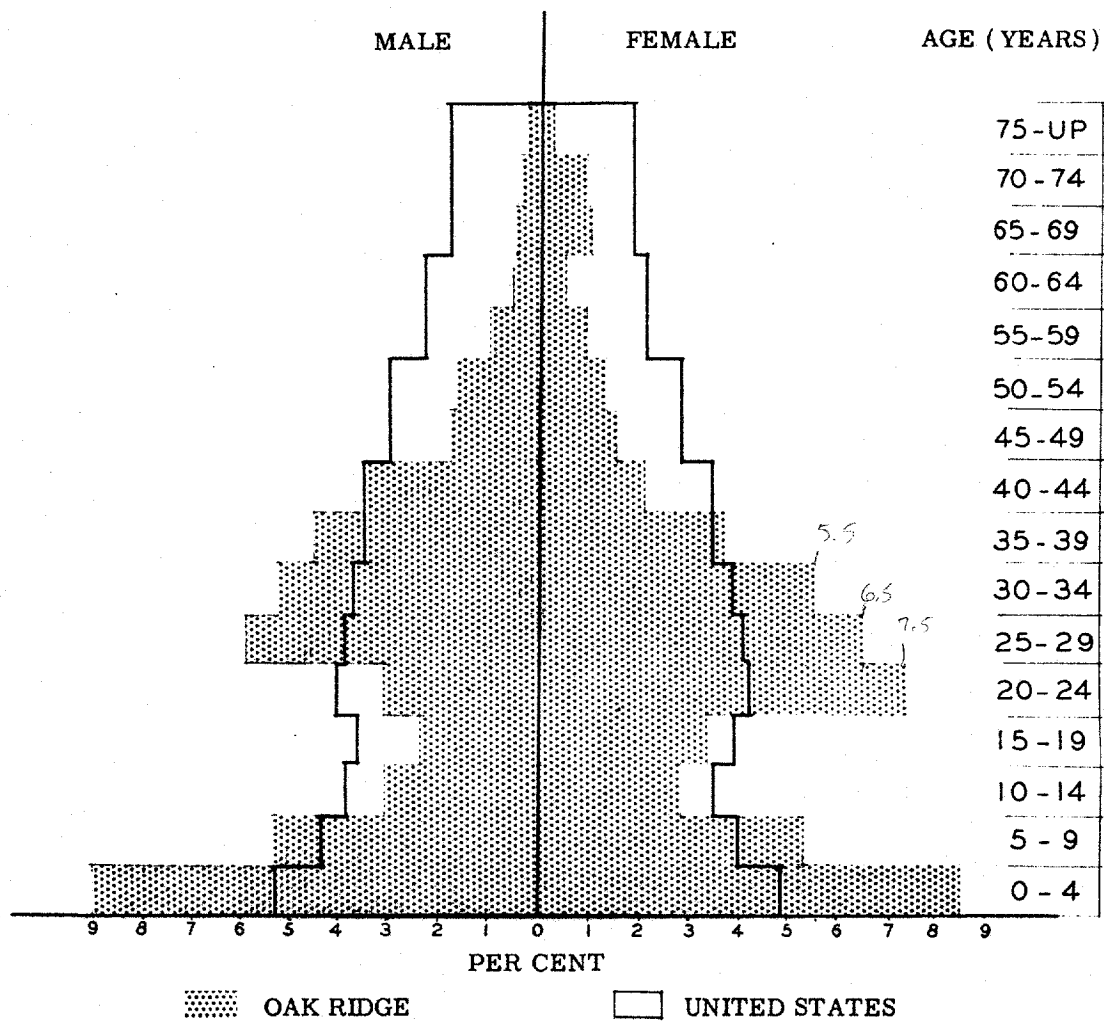
APPENDIX NO. 2

POPULATION BY AGE AND SEX

Oak Ridge, January 15, 1948

United States 1947

(Percentages based on population of all ages)



Oak Ridge Data from Office of the Medical Advisor, A. E. C.

United States Data from Bureau of the Census

Division of Public Health Statistics

APPENDIX NO. 3

ZONING RESOLUTION OF THE OAK RIDGE, TENNESSEE, PLANNING REGION

(NOTE: Although the legal form and derivation of powers of this resolution apply to a Planning Region and use by a Regional Planning Commission, the insertion and substitution in the appropriate sections, of corresponding municipal legal form and derivation of powers will make the resolution applicable to an incorporated municipality and for use by a City Planning Commission.)

A RESOLUTION, IN PURSUANCE OF THE AUTHORITY GRANTED BY CHAPTER 33, PUBLIC ACTS OF 1935, AS AMENDED BY CHAPTER 86, PUBLIC ACTS OF 1941, TO PROVIDE FOR THE ESTABLISHMENT OF DISTRICTS WITHIN THE OAK RIDGE, TENNESSEE, PLANNING REGION, AS DEFINED, TO REGULATE WITHIN SUCH DISTRICTS, THE LOCATION, HEIGHT, BULK, NUMBER OF STORIES AND SIZE OF BUILDINGS AND OTHER STRUCTURES, THE PERCENTAGE OF LOT OCCUPANCY, THE SIZE OF YARDS, COURTS AND OTHER OPEN SPACES, THE DENSITY OF POPULATION AND THE USE OF BUILDINGS, STRUCTURES AND LAND; TO PROVIDE FOR A BOARD OF ZONING APPEALS; AND TO PROVIDE METHODS OF ADMINISTRATION OF THIS RESOLUTION AND PENALTIES FOR THE VIOLATION THEREOF.

THE PUBLIC WELFARE REQUIRING IT, be it resolved by the QUARTERLY COUNTY COURT OF ANDERSON COUNTY AS FOLLOWS:

ARTICLE I. SHORT TITLE

SECTION 101.

This resolution shall be known as the "Zoning Resolution of the Oak Ridge, Tennessee, Planning Region."

ARTICLE II. DEFINITIONS

SECTION 201.

For the purpose of this resolution certain words and tenses used herein shall be interpreted or defined as follows:

Words used in the present tense include the future tense.

The singular number includes the plural and the plural the singular.

The word "person" includes a corporation as well as an individual.

The term "shall" is always mandatory.

Terms not herein defined shall have the meanings customarily assigned to them.

Apartment: An apartment is a room or suite of rooms used as a single family dwelling including bath and culinary accommodations, located in a building in which are three or more such rooms or suites.

Apartment Hotel: An apartment building under resident supervision which maintains an inner lobby through which all tenants must pass to gain access to the apartments and which may furnish for the exclusive use of its tenants by previous arrangement and not to anyone who may apply, services ordinarily furnished by such hotels.

Apartment House: See Dwelling, Multiple.

Building: Any structure having a roof supported by columns or by walls, including tents, lunch wagons, trailers or similar structures whether stationary or removable.

Building, Accessory: A subordinate building the use of which is incidental to that of a principal building on the same lot.

Building Area: That portion of the lot occupied by the main building and accessory buildings and other structures.

Building, Height of: The vertical distance measured from the mean elevation of the proposed finished grade line of the ground about the perimeter of the building to the highest point of the roof for flat roofs; to the deck line of mansard roofs; and to the mean height between eaves and ridge for gable, hip and gambrel roofs.

Building, Principal: A building in which is conducted the main or principal use of the lot on which said building is situated.

Building Setback: The required distance by which any building or structure must be separated from the street or lot lines.

Court: An unoccupied open space, other than a yard, on the same lot with a building, which is bounded on two or more sides by the walls of such building.

Dwelling: A building designed or used as the living quarters for one or more families, except that the word "dwelling" shall not include boarding or rooming houses, tents, tourist camps, hotels, trailers, trailer camps, or other structures designed or used for transient residents.

Dwelling, One-Family: A detached building designated for or occupied exclusively by one family.

Dwelling, Two-Family: A building designated for or occupied exclusively by two families living independently of each other.

Dwelling, Multiple: A building used or designated as a residence for three or more families living independently of each other, including apartment houses, apartment hotels, row or group houses.

Dwelling, Row or Group: A building consisting of a series of non-communicating one-family sections having a common wall between two adjacent sections.

Family: One or more persons occupying the premises and living as a single housekeeping unit and doing their cooking on the premises as distinguished from a group occupying a club, fraternity, or hotel.

Filling Station: Buildings or premises, or portion thereof, arranged, intended or designed to be used for the retail sale of gasoline, or oil or other fuel for the propulsion of vehicles. For the purpose of this resolution, there also shall be deemed to be included within this term any area or structure used or designed to be used for polishing, greasing, washing, spraying, dry cleaning or otherwise cleaning or servicing such motor vehicles.

Garage, Private: An accessory or portion of a main building to be used for the storage of non-commercial motor vehicles.

Garage, Public: Any garage other than a private garage, available to the public, operated for gain, and which is used for storage, repair, rental, greasing, washing, servicing, adjusting, or equipping of automobiles or other motor vehicles.

Home Occupation: An occupation for gain or support conducted only by members of a family residing on the premises, and conducted entirely within the dwelling, provided that no article is sold or offered for sale except such as may be produced by members of the immediate family residing on the premises.

Lot: A parcel of land occupied or intended to be occupied by one building, and the accessory buildings or uses customarily incident to it, including such open spaces as are required by this ordinance.

Lot, Corner: A parcel of land at the junction of and fronting on two or more intersecting streets, the front of which shall be the narrower side abutting a street.

Lot, Depth of: A mean horizontal distance between the front and rear lot lines.

Lot, Line: The lines bounding a lot as defined herein.

Lot, Through: A lot having its front and rear lines on different streets.

Lot, Width of: The mean width measured at right angles to its depth.

Non-conforming Use: A building, structure or use of land lawfully used and occupied at the time of enactment of this resolution, which does not conform to the regulation of the district in which it is situated.

Open Space, Required: The unoccupied space, open to the sky, on the same lot with a building or structure, established between the street or lot lines and the minimum building setback lines.

Street: A public or private thoroughfare which affords the principal means of access to abutting property.

Structure: Any combination of materials, including buildings, constructed or erected, the use of which requires location on the ground, including signs, billboards, and fences.

ARTICLE III. ESTABLISHMENT OF DISTRICTS AND BOUNDARIES THEREOF

SECTION 301.

For the purpose of this resolution, the Oak Ridge Planning Region, is hereby divided into eight (8) types of districts designated as follows:

1. F.A.R. Districts - Forestry, Agriculture, Recreation Districts.
2. R-1 Districts - One and Two-Family Residence Districts.
3. R-2 Districts - Multiple-Family Residence Districts.
4. R-3 Districts - Motel and Trailer Park Districts.
5. B-1 Districts - Neighborhood Business Districts.
6. B-2 Districts - General Business Districts.
7. B-3 Districts - Roadside Filling Station Districts.
8. I-1 Districts - Industrial Districts.

SECTION 302.

The boundaries of these districts are shown on the "Zoning Map of the Oak Ridge Planning Region," which accompanies and which, with all explanatory matter thereon, is hereby made a part of this resolution. An official copy of the Zoning Map as amended from time to time shall be maintained and exhibited in the office of the Building Inspector.

SECTION 303.

Unless shown otherwise, the boundaries of the districts are lot lines, the center line of streets, roads, railroads, or such lines extended, and the boundaries of federal lands. Questions concerning the exact location of district boundary lines shall be determined by the Board of Zoning Appeals.

ARTICLE IV. APPLICATION OF REGULATIONS

SECTION 401.

Except as otherwise provided in this resolution, no structure or land shall hereafter be used or occupied and no structure or part thereof shall be erected, moved, or altered except in conformity with the regulations herein specified for the district in which it is located.

ARTICLE V. F.A.R. DISTRICTS FORESTRY-AGRICULTURE-RECREATION DISTRICTS

The following regulations shall apply in all F.A.R. Districts:

SECTION 501. Uses Permitted.

- (a) One-Family dwelling.
- (b) Customary agricultural operations including general purpose farms; truck gardening; plant nurseries; commercial greenhouses; stock, dairy, and poultry farms; stables; animal boarding, raising, or keeping, providing no structure for the confinement of stock or animals, or storage of manure or odor or dust-

producing substance, or greenhouse heating plant shall be permitted within 200 feet of the boundary of any other district.

- (c) Churches, schools, private clubs, and places of indoor public assembly not operated for profit.
- (d) Public open-air recreation areas such as parks, playgrounds, golf courses, ball fields, and tennis courts.
- (e) Municipal county, state, or federal uses and public utilities.
- (f) Philanthropic or eleemosynary institutions other than a camp, hospital, sanitarium, correctional institution, or institution for the insane.
- (g) Accessory structures and uses customarily incidental to the above uses, including private garages, customary home occupations engaging not more than two persons; offices of a physician, dentist, or a minister of religion; and the taking of tourists, boarders, or roomers. Subject to the following conditions:
 - (1) Customary home occupations and offices shall be conducted only in a dwelling by persons resident therein, provided not more than one (1) person not a resident of the premises, is employed. The area designed or used for such home occupations in a dwelling shall not exceed twenty-five (25) per cent of the total floor area of said dwelling.
 - (2) In any dwelling, not more than two (2) rooms shall be used for tourists, boarders, or roomers.
 - (3) One name plate not over two (2) square feet in area may be used but there shall be no public display of goods.
- (h) One sign pertaining to the sale, lease, rent, or use of a lot or building may be maintained provided the total area of said signs on any one lot does not exceed six (6) square feet, and one identification sign, not exceeding eighteen (18) square feet in area for farms, nurseries, greenhouses, or buildings other than dwellings may be used provided that if not attached flat against a building they shall be at least twenty (20) feet distant from all street lines and if illuminated shall be only by indirect means.

SECTION 502. Permissible on Appeal

Under such conditions as the Board of Zoning Appeals may impose to preserve and promote the character of the character of the district and the zoning resolution.

- (a) Aviation; mining or quarrying so long as there is no processing or storage on the premises; temporary portable sawmills for the sawing of timber harvested in the immediate vicinity, but not including permanent plants for finishing or fabricating lumber.
- (b) Temporary recreation uses such as circuses and carnivals.
- (c) Roadside stands for the sale of produce and handicrafts grown or made primarily on the premises, and one sign pertaining only thereto, provided such sign does not exceed a total of eighteen (18) square feet in area, and is located at least twenty (20) feet from the street line, and illuminated only by indirect means.
- (d) A cemetery, airport, camp, hospital sanitarium, correctional institution, or institution for the insane.
- (e) Any use comparable in character to those permitted in Section 501 and 502 herein.
- (f) Private open air recreation areas and uses, such as drive-in-theatres, golf-driving ranges, ball parks, etc.

SECTION 503. Area and Bulk Regulations

- (a) Minimum building setbacks:
From any lot line - Fifty (50) feet.
From any street line - Fifty (50) feet, except roadside stands which need be only twenty (20) feet.
- (b) Minimum lot size:
Five (5) acres per dwelling.
- (c) Maximum height:
No building shall intersect at any point a line projected upward at 45 degrees from the nearest lot line.
- (d) Maximum building area:
Ten (10) per cent of the total lot area.

ARTICLE VI.
R-1 DISTRICTS - SINGLE
AND TWO-FAMILY RESIDENCE DISTRICTS

The following regulations shall apply in all R-1 Districts:

SECTION 601. Uses Permitted

- (a) One-family dwellings.
- (b) Two-family dwellings.
- (c) Churches or similar places of worship. Elementary schools, high schools, and institutions for higher education, provided no such building shall be permitted within one hundred (100) feet of any dwelling.
- (d) Public parks and playgrounds and other municipal recreation uses.
- (e) Public libraries and museums.
- (f) Public utility structure or use necessary for the service of the area.
- (g) Professional offices of physicians, dentists, or ministers of religion, and home occupations conducted only in the main building and only by a resident in said building, provided not more than one (1) person, not a resident of the premises is employed, subject to the following conditions:
 - (1) The area designated or used for such professional or occupational use in a dwelling shall not exceed twenty-five (25) per cent of the total floor area of said dwelling.
 - (2) One name plate, not over two (2) feet square in area may be used but there shall be no public display of goods.
- (h) Customary accessory uses and buildings, including private garages, having a capacity not exceeding two vehicles per dwelling unit, the taking of not more than two (2) non-transient roomers, provided that no sign is displayed and provided such uses are incidental to the principal use. Any accessory building shall be located on the same lot with the principal building.
- (i) One sign advertising the sale or rent of the land or buildings upon which it is located or one bulletin board for churches, schools, or public buildings. Such sign or bulletin board shall not exceed six (6) square feet in area, shall not be illuminated except by indirect means and shall be distant from the street line not less than one-half the front building setback distance.
- (j) Temporary buildings for uses incidental to construction work, which buildings shall be removed upon the completion or abandonment of construction work.
- (k) Nurseries and gardens for propagation and culture only, with no retail sales permitted on the premises; general crop agriculture.

SECTION 602. Permissible on Appeal

Under such conditions as the Board of Appeals may impose to preserve and promote the character of the district and the zoning resolution.

- (a) Private kindergartens.
- (b) Keeping and raising of domestic animals (except for commercial purposes) including chickens and rabbits, but not hogs, horses, and cows.

SECTION 603. Area and Bulk Regulations

- (a) Minimum building setbacks:
 - Front - Twenty (20) feet from street line except as provided in Section 1401(a) and 1605(c).
 - Side - Ten (10) feet from lot line, except on every corner lot in a residence district there shall be provided on the street side a side yard equal in depth to the required front yard depth on said side street and except as provided in Section 1401.
 - Rear - Thirty (30) feet from lot line. Accessory buildings as provided under Section 1404 may be located in the rear yard.
- (b) Minimum lot size:

- 7,200 square feet - one-family dwelling.
- 10,800 square feet - two-family dwelling.
- (c) Maximum height:
 - No building shall intersect at any point projected upward at 45 degrees from the nearest lot line.
- (d) Maximum building area, including accessory buildings.
 - Thirty (30) per cent of the total lot area.

ARTICLE VII.
R-2 DISTRICTS - MULTIPLE RESIDENCE DISTRICTS

The following regulations shall apply in all R-2 Districts:

SECTION 701. Uses Permitted

- (a) All uses permitted in R-1 District. Subject to the provisions specified therefor.
- (b) Multiple-family dwellings.
- (c) Dormitories.
- (d) Apartment hotels.
- (e) Fraternity and sorority houses.
- (f) Hospitals and clinics, but not animal hospitals or clinics or mental hospitals, sanitariums, rest homes, philanthropic and eleemosynary institutions and similar uses. No such use, however, shall be established or permitted on a parcel of land less than two (2) acres in area, nor shall any part or portion of such use be permitted within one hundred (100) feet of any street or lot line.

SECTION 702. Area and Bulk Regulations

- (a) Minimum building setbacks:
 - Front - Twenty (20) feet from street line.
 - Side - Ten (10) feet from lot line with same exceptions as provided for single and two-family residences, except for the purpose of side yard regulations, the following dwellings with common party walls shall be considered as one building occupying one lot: Semi-detached two and four-family dwellings, row dwellings, group dwellings, and court apartments.
 - Rear - Thirty (30) feet from lot line. Accessory buildings as provided under Section 1404 may be located in the rear yard.
- (b) Minimum lot size:
 - 7,200 square feet - first family.
 - 3,600 square feet - second family.
 - 1,500 square feet - each family over two.
- (c) Maximum height:
 - No building shall intersect at any point a line projected upward at 45 degrees from the nearest lot line.
- (d) Maximum building area, including accessory buildings.
 - Forty (40) per cent of the total lot area.

ARTICLE VIII.
R-3 DISTRICTS - MOTEL AND TOURIST PARK DISTRICTS

The following regulations shall apply in all R-3 Districts:

SECTION 801. Uses Permitted

- (a) Motels.
- (b) Tourist Courts.
- (c) Trailer Camps serving a transient traveling public only.
- (d) Gasoline filling station (permissible only in conjunction with a motel, tourist court, or trailer camp and located on the same lot.)
- (e) Lunch Room or restaurant.
- (f) Advertising signs, etc. only when pertaining to the sale, rental, or use of the premises on which it is located, or to goods sold or activities conducted thereon, provided that there will be no overhanging signs and that no such sign shall exceed ten (10) square feet in area or be located closer to the street line than one-half the front building set-back distance unless

attached to the face of the structure, in which event no sign shall project more than one (1) foot therefrom, or exceed two (2) square feet in area for each lineal foot of building frontage, and if illuminated shall not be of the flashing or intermittent type.

SECTION 802. Area and Bulk Regulations

- (a) Minimum building setbacks:
From street line - Twenty-five (25) feet for those buildings in the district facing or parallel to a public street, and not less than thirty (30) feet from the center line of any private roadway or street within the district.
From any lot line - Twenty-five (25) feet.
- (b) Minimum lot size:
At least two thousand (2,000) square feet of space per tourist cabin accommodation or trailer space provided, not including private driveways and area utilized for filling station, lunch room, or service facilities.
- (c) Maximum height:
No building shall be erected to a height in excess of fifteen (15) feet.
- (d) Maximum lot occupancy:
None except as controlled by setbacks and specified lot size.

SECTION 803. Required Service Facilities

Establishments providing space for more than five (5) trailers shall provide a permanent washroom and toilet building or buildings for every twenty (20) or fraction thereof trailers accommodated after the first five. Separate toilet facilities shall be provided for males and females.

SECTION 804. Period of Tenancy of Trailer Space

Establishments providing space for trailers shall not permit occupancy of such space by any one individual to exceed a period of one (1) month.

ARTICLE IX.

B-1 DISTRICTS - NEIGHBORHOOD BUSINESS DISTRICTS

The following regulations shall apply in all B-1 Districts:

SECTION 901. Uses Permitted

- (a) Food market.
- (b) Drug store.
- (c) Barber shop.
- (d) Beauty shop.
- (e) Dry cleaning and laundry pick-up service.
- (f) Delicatessen.
- (g) Shoe repair and shoe shine shop.
- (h) Municipal use; public utilities structure or use.
- (i) Accessory structures, uses and signs customarily incidental to the above permitted uses, subject to the following restrictions:
 - (1) Advertising signs only when pertaining to the sale, rental, or use of the premise on which it is located or to goods sold or activities conducted thereon, provided that there will be no overhanging signs, and that no such sign shall exceed two (2) square feet in area for each lineal foot of building frontage. It is further provided that such signs shall be attached only to the face of the structure with no portion projecting more than one (1) foot therefrom, and if illuminated shall not be of the flashing or intermittent type.

SECTION 902. Permissible on Appeal

(Under such conditions as the Board of Appeals may impose to preserve and promote the character of the district and the zoning resolution.)

- (a) Any similar retail business or service of the same

general character as those listed in Section 901, hereof, which is established for the convenience of neighboring residents.

- (b) Filling station.

SECTION 903. Uses Prohibited

- (a) All uses not specifically permitted herein.

SECTION 904. Area and Bulk Regulations

- (a) Minimum building setbacks:
Front - Twenty (20) feet from the street line.
Side - None required except;
 - (a) On a corner lot which borders on a residential district, there shall be provided a setback on the side street equal in depth to the required front setback on said side street.
- Rear - Twenty (20) feet from lot line to provide space adequate for loading and unloading of vehicles. Such space shall be provided with vehicular access to a street or alley.
- (b) Minimum lot size:
None.
- (c) Maximum height:
No building shall intersect at any point a line projected upward at 45 degrees from the street line of an abutting street or the boundary of an adjoining residential district.
- (d) Maximum lot occupancy:
None except as controlled by setbacks and height requirements.

ARTICLE X.

B-2 DISTRICTS - GENERAL BUSINESS DISTRICTS

The following regulations shall apply in all B-2 Districts:

SECTION 1001. Uses Permitted

- (a) All uses permitted in B-1 Districts subject to the provisions specified therefor.
- (b) Public libraries and museums.
- (c) Municipal use; public utilities structure or use.
- (d) Stores and shops for the conducting of any retail business.
- (e) Banks, offices, studios, hotels, and churches.
- (f) Restaurants, tea rooms, cafes, and other places serving food or beverages.
- (g) Theatres, billiard or pool parlors, bowling alley, skating rink, or similar recreation uses or places of assembly.
- (h) Private schools conducted for gain.
- (i) Undertaker.
- (j) Lodge halls, temples, or private clubs.
- (k) Bus passenger station.
- (l) Baking, confectionery, catering, dressmaking, dyeing, laundry, printing, tailoring, upholstering, and similar establishments and businesses of a similar and no more objectionable character subject to the following provisions:
 - (1) All goods or products manufactured or processed shall be sold at retail on the premises.
 - (2) All such manufacturing or processing shall be done on the premises and not more than five (5) persons shall be so employed at any one time.
- (m) Filling stations, public garages, automobile repair shops, automobile service stations at which general repairing is done, automobile parking lots, used car lots.
- (n) Advertising signs only when pertaining to the sale, rental, or use of the premises on which it is located, or to goods sold or activities conducted thereon, provided that there will be no overhanging signs, and no such sign shall exceed in display surface an area of ten (10) square feet, unless attached to a building in which event no such sign shall project more than one (1) foot therefrom or exceed two (2) square feet in

- area for each lineal foot of building frontage. If signs are illuminated they shall not be of the flashing or intermittent type.
- (o) Accessory structures and uses customarily incidental to the above permitted use.

SECTION 1002. Permissible on Appeal

(Under such conditions as the Board of Appeals may impose to preserve and promote the character of the district and the zoning resolution.)

- (a) Wholesale, storage and warehouse facilities and freezer lockers.

SECTION 1003. Uses Prohibited

- (a) Any use which is offensive or dangerous or which tends to depreciate the value of neighboring properties by reason of the emission of smoke, fumes, dust, odor, vibration or noise, or the storage or use of inflammable or explosive materials.
- (b) All uses not specifically permitted herein.

SECTION 1004. Area and Bulk Regulations

- (a) Minimum building setbacks:
From streets - None required.
From interior lot lines - None required.
- (b) Minimum lot size:
None.
- (c) Maximum height:
No building shall intersect at any point a line projected upward at 45 degrees from the center line of an abutting street or the boundary line of an adjoining residence district.
- (d) Maximum lot occupancy:
None except as controlled by setbacks.

SECTION 1005. Loading and Unloading

Adequate provisions shall be made for loading and unloading of vehicles off the public right-of-way. If a recessed loading and unloading dock is used, headroom of fourteen (14) feet shall be provided.

ARTICLE XI.

B-3 DISTRICTS - ROADSIDE FILLING STATIONS DISTRICTS

The following regulations shall apply in all B-3 Districts:

SECTION 1101. Uses Permitted

- (a) Filling stations subject to the following provisions:
- (1) No service work is performed outdoors.
 - (2) Pumps are located at least twenty (20) feet from any street line or highway right-of-way.
 - (3) All fuel, oil, or similar substances are stored at least thirty-five (35) feet distant from any street or lot line.
- (b) Advertising signs only when pertaining to the sale, rental, or use of the premise on which it is located or to goods sold or activities conducted thereon, provided that there will be no overhanging signs, and that no such sign shall exceed ten (10) square feet in area or be located closer to the street line than one-half the front building setback distance, unless attached to the face of the structure in which event no sign shall project more than one (1) foot therefrom, or exceed two (2) square feet in area for each lineal foot of building frontage and if illuminated shall not be of the flashing or intermittent type.

SECTION 1102. Uses Prohibited

All other uses.

SECTION 1103. Area and Bulk Regulations

- (a) Minimum building setback:
From street, alley or lot lines - Thirty (30) feet.

- (b) Minimum lot size:
None.
- (c) Maximum height:
Fifteen (15) feet.
- (d) Maximum lot occupancy:
None except as controlled by setbacks.

ARTICLE XII.

I-1 DISTRICTS - INDUSTRIAL DISTRICTS

The following regulations shall apply in all I-1 Districts:

SECTION 1201. Uses Permitted

- (a) Light manufacturing establishments, processes and facilities such as: baking plant; bottling works; building materials yards; bus repair and storage facilities; carting, express, hauling, or storage yard; city service and maintenance facilities, including buildings and outdoor storage; coal, coke, or wood yards; cold storage plant; contractor's plant or storage yard; creamery; dairy; dyeing or dry cleaning plant; electric light or power generating station; freight terminal; greenhouse - commercial; ice cream manufacture; ice manufacture; lumber yard; milk bottling or central distributing station; monument works; motor vehicle repair shop; power laundry; public utility structures and uses; railroad yards; steam plant; trucking terminal; warehouses, A.E.C. and City; wholesale business, storage and warehouse facilities.
- (b) Metal working, provided that no stamping, punching, or pressing machine weighing more than five (5) tons is installed or used and further provided that no permits shall be issued except with the written approval of the Board of Appeals and subject to their determination that excessive smoke, noise, or vibration will not result.
- (c) The storage of petroleum products, provided that no permit shall be issued except with the written approval of the Board of Appeals, subject to such conditions as to safety and distance from lot lines and other features as the Board of Appeals may require.
- (d) Any accessory use or buildings customarily incidental to the above permitted uses.
- (e) Advertising signs only when pertaining to the sale, rental, or use of the premises on which it is located, or to goods sold or activities conducted thereon, provided that there will be no overhanging signs, and that no such sign shall exceed in display surface an area of twenty (20) square feet, unless attached to the face of the structure in which event no sign may exceed two (2) square feet in area for each lineal foot of building frontage.

SECTION 1202. Permitted on Appeal

- (a) Other uses of a similar and no more objectionable character, and which in the opinion of the Board of Appeals will not be injurious because of offensive dust, smoke, refuse matter, odor, gas fumes, noise, vibration, or hazardous on account of danger of fire or explosion, may be permitted subject to such conditions, restrictions, and safeguards as may be deemed necessary by said Board in the interest of public health, safety, and welfare.
- (b) Any industrial useage associated with the manufacture or supply of articles or material required in the Atomic Energy Commission plant processes, subject to the provisions of Section 1202(a) hereof.

SECTION 1203. Uses Prohibited

- (a) All uses not specifically permitted herein.
- (b) Any use which is offensive or dangerous or which tends to depreciate the value of neighboring properties by reason of the emission of smoke, dust, odor, gas, fumes, noise, vibration, or the storage or use of inflammable or explosive materials.

SECTION 1204. Area and Bulk Regulations

- (a) Minimum building setbacks:
None required except as controlled by maximum height.
- (b) Minimum lot size:
None.
- (c) Maximum height:
No building shall intersect at any point projected upward at 45 degrees from the nearest lot line.
- (d) Maximum lot occupancy:
None except as controlled by heights and setbacks required.

SECTION 1205. Loading and Unloading

Same as for B-2 Districts.

ARTICLE XIII. NON-CONFORMING USES

SECTION 1301.

Any structure or use existing at the time of enactment of this resolution, but not in conformity with the provisions contained in such resolution may be continued, but may not be:

- (a) Changed to another non-conforming use.
- (b) Re-established after discontinuance for six (6) months.
- (c) Extended except in conformity with this resolution.
- (d) Rebuilt or repaired after damage exceeding the assessed value of the building immediately prior to damage, or after the expiration of one (1) year from date of damage, unless changed to a conforming use.

Except that any non-conforming use of property in a one and two-family residence district shall be made to conform to the use provisions of this resolution within a period of three (3) years from the date of enactment of this resolution.

ARTICLE XIV. SUPPLEMENTARY REGULATIONS

The provisions of this resolution shall be subject to such exceptions, additions, or modifications as herein provided by the following supplementary regulations.

SECTION 1401. Accessory Buildings in Residence Districts

Accessory buildings in residence districts and on any lot used primarily for residential purposes shall conform to the following regulations except as may be otherwise provided elsewhere in this resolution:

- (a) Accessory buildings shall not exceed thirteen (13) feet in height, shall be located at least three (3) feet from all adjoining lot lines, and shall not be erected in any open space required in front or at the side of a principal building except; (1) where in the opinion of the Board of Appeals it is determined that an undue hardship would be caused due to excessively steep topography and in no case shall such accessory building be closer than five (5) feet from the street line; (2) upon the written consent of the adjoining property owners, such buildings may be built upon common lot lines.
- (b) Accessory buildings may occupy rear yard spaces provided that such buildings do not occupy more than thirty-five (35) per cent of the required rear yard area.
- (c) On any corner lot in a residential district no part of any accessory building shall be nearer the side street lot line than the least depth of any front open space required along such side street.
- (d) No accessory building whatever located on a lot shall be used for residential purposes.

SECTION 1402. Off-Street Automobile Storage

Off-street automobile parking or storage shall be required on the same lot with each principal use of land, except as otherwise excepted herein, in an amount equal at least to

the minimum requirements for the specific types of land use set forth below, and such space shall be provided with vehicular access to a street:

- (a) Single and Two-Family Residences - One (1) car parking space for each family unit subject to appeal authorized in Section 1605(c).
- (b) Multiple-Family Residences - One (1) car parking space for each family dwelling unit up to twenty (20) families, then two (2) spaces for each three (3) units above twenty (20), provided further, that the twenty (20) foot minimum front setbacks shall not be used for the open-air parking or storage of any motor vehicle.
- (c) Tourists, Motels, Trailer Camps, Roomers and Boarders - One (1) car parking space for each room offered for such use.
- (d) Retail Establishments - Two (2) square feet for each square foot of gross ground floor area of the building where such floor area exceeds five hundred (500) square feet.
- (e) Roadside Stands - Not less than five (5) car parking spaces, for which the required front setback space may be used.
- (f) Industrial Plants - One (1) car parking space for each ten (10) employees.
- (g) All Other Uses Including Churches, Theatres, and Hotels - One (1) car parking space for each five (5) persons for which the facilities are designed or arranged to accommodate including employees.
- (h) Exceptions - If vehicle storage or standing space required by this resolution is provided in public parking areas or in other off-street parking areas provided by groups of property owners for their mutual benefit within two hundred (200) feet of the main entrances to such principal uses, in the event off-street parking or storage space cannot be reasonably provided on the same lot on which the principal use is conducted, the Board of Zoning Appeals may construe such use of this space as meeting the off-street parking requirements of this resolution. Such vehicle standing space shall be deemed to be required open space associated with the permitted use and shall not thereafter be reduced or encroached upon in any manner.

SECTION 1403. Group Housing Projects

In the case of a housing project consisting of a group of two or more buildings to be constructed on a plot of ground of at least four (4) acres not subdivided into the customary streets and lots and which will not be so subdivided or where the existing or contemplated streets and lot layout makes it impracticable to apply the requirements of this resolution to the individual buildings in such housing projects, the application of such requirements to such housing project may be adjusted by the Board of Zoning Appeals in a manner that will be in harmony with the character of the neighborhood, will insure substantially the same character of occupancy, and a density of land use no higher and a standard of open space at least as high as required by this resolution in the district in which the proposed project is to be located.

In no case shall the Board of Zoning Appeals authorize a use or a building height or building area prohibited in which the housing project is to be located.

SECTION 1404. Reduction in Lot Area

Except as otherwise provided in this resolution, no lot shall be reduced in area so that required open spaces less than the minimum specified by this resolution shall result.

SECTION 1405. Lot of Record

Where the owner of a lot of official record at the time of adoption of this resolution does not own and cannot acquire sufficient adjacent land to enable him to conform to the open space and other requirements herein prescribed, such lot may be used by said owner as a building site provided the open space and other provisions conform as closely as possible in the opinion of the Board of Zoning Appeals to the requirements for the district in which it is located.

SECTION 1406. Lot Frontage

No dwelling shall be erected on a lot which does not abut on at least one street for at least thirty (30) feet, except that a dwelling which does not abut on a street as herein required shall be deemed to meet this requirement if vehicular access to a street is provided by an easement at least twenty (20) feet in width.

SECTION 1407. Exceptions to Height Limits

The height limits of this resolution shall not apply to church spires, belfries, cupolas, penthouses, domes, monuments, water towers, observation towers, power transmission towers, radio towers, masts and aerials, flagpoles, chimneys, smokestacks, ventilators, skylights, derricks, conveyers, cooling towers, and other similar and necessary mechanical appurtenances usually carried above the roof level and similar industrial structures where required by the manufacturing process. No tower shall be used as a place of habitation, nor shall any sign, nameplate, display or advertising device of any kind whatsoever, be inscribed upon or attached to any of the structures listed herein.

SECTION 1408. Relationship Between Enactment and Subsequent Amendments.

Any provisions of this resolution relating to the use of lots of record or to the use of land and buildings as existing at the time of the enactment of this resolution shall be construed to refer to conditions as they may exist at the time of amendment affecting the use of said lot of record, or the use of said land and buildings.

ARTICLE XV. ADMINISTRATION AND ENFORCEMENT

SECTION 1501. Enforcing Officer

The provisions of this resolution shall be enforced and administered by a building inspector who shall be a resident of the Oak Ridge Region and who shall be appointed by the Judge of the Quarterly Court of Anderson County from a list of nominees submitted by the Oak Ridge Regional Planning Commission. This appointment shall be for a two (2) year term and confirmed by the Quarterly Court of Anderson County. The building inspector shall have the right to enter upon the premises for the purpose of making inspections of buildings or premises necessary to carry out his duties in the enforcement of this resolution.

SECTION 1502. Building Permit Required

It shall be unlawful to commence the excavation for or the construction of any building or other structure including accessory structures, or other use of land, or to commence the moving, alteration, or repair of any structure including accessory structures, costing over one hundred (\$100) dollars or exceeding one hundred (100) square feet in area, until the building inspector has issued for such work a building permit including a statement that the plans, specifications, and intended use of such structure in all respects conform with the provisions of this resolution. Application for a building permit shall be made in writing to the building inspector on forms provided for that purpose. Fees shall be determined by the Planning Commission, but shall not exceed five (\$5.00) dollars for each building permit plus an additional fee of two (\$2.00) dollars for each one thousand (\$1,000) dollars or fraction thereof of the estimated construction cost. Building permits shall be void after six months from the date of issue unless substantial progress has been made by that time.

SECTION 1503. Approval of Plans and Issuance of Building Permit.

It shall be unlawful for the building inspector to approve any plans or issue a building permit for any excavation or construction until he has inspected such plans in detail and found them in conformity with this resolution. To this end, the building inspector shall require that every application for

a building permit for excavation, construction, moving or alteration be accompanied by a plan or plat drawn to scale and showing the following in sufficient detail to enable the building inspector to ascertain whether the proposed work is in conformance with this resolution:

- (a) The actual shape, location, and dimensions of the lot to be built upon.
- (b) The shape, size, and location of all buildings or other structures to be erected, altered, or moved and of any buildings or other structures already on the lot.
- (c) The existing and intended use of the lot and of all such buildings or other structures upon it.
- (d) Such other information concerning the lot or adjoining lots as may be essential for determining whether the provisions of this resolution are being observed.

If the proposed excavation, construction, moving or alteration or use of land as set forth in the application are in conformity with the provisions of this resolution, the building inspector shall issue a building permit for such excavation or construction. If any application for a building permit is not approved, the building inspector shall state in writing on the application the cause for such disapproval. Issuance of a permit shall in no case be construed as waiving any provisions of this resolution.

SECTION 1504. Certificate of Occupancy

No land or building or other structure or part thereof hereafter erected, moved or altered in its use shall be used until the building inspector shall have issued a certificate of occupancy stating that such land, structure, or part thereof is found to be in conformity with the provisions of this resolution. Within three (3) days after notification that a building or premises or part thereof is ready for occupancy, it shall be the duty of the building inspector to make a final inspection thereof, and to issue a certificate of occupancy, if the building or premises or part thereof is found to conform with the provisions of this resolution; or if such certificate is refused, to state the refusal and its cause in writing.

SECTION 1505. Penalties

Any person violating any provision of this resolution shall be guilty of a misdemeanor and upon conviction shall be fined not more than fifty (\$50) dollars for each offense. Each day such violation continues shall constitute a separate offense.

SECTION 1506. Remedies

In case any building or other structure is erected, constructed, altered, repaired, converted, or maintained, or any building, structure, or land is used in violation of this resolution, the building inspector or any other appropriate authority or any adjacent or neighboring property owner who would be specially damaged by such violation, in addition to other remedies, may institute injunction, mandamus, or other appropriate action or proceeding to prevent such unlawful erection, construction, reconstruction, alteration, repair, conversion, maintenance, or use; or to correct or abate such violation; or to prevent occupancy of such building, structure, or land.

ARTICLE XVI. BOARD OF ZONING APPEALS

SECTION 1601. Creation

A Board of Zoning Appeals is hereby established in accordance with Section 6, Chapter 33, Public Acts of 1935 as authorized by Chapter 158, Public Acts, 1939.

SECTION 1602. Appointment

The Oak Ridge, Tennessee, Regional Planning Commission is hereby designated as the Board of Zoning Appeals.

SECTION 1603. Procedure

Meetings of the Board of Zoning Appeals shall be held at

the call of the Chairman, and at such other times as the Board may determine. Such Chairman or, in his absence, the acting chairman, may administer oaths and compel the attendance of witnesses. All meetings of the Board shall be open to the public. The Board shall adopt rules of procedure and shall keep records of applications and action thereon, which shall be a public record.

SECTION 1604. Appeals, How Taken

An appeal to the Board of Zoning Appeals may be taken by any person, firm or corporation aggrieved, or by any governmental officer, department, board or bureau affected by any decision of the building inspector based in whole or in part upon the provisions of this resolution. Such appeal shall be taken by filing with the Board of Zoning Appeals a notice of appeal, specifying the grounds thereof. The building inspector shall transmit to the Board all papers constituting the record upon which the action appealed was taken. The Board shall fix a reasonable time for the hearing of the appeal, but not to exceed thirty (30) days, give public notice thereof, as well as due notice to the parties in interest, and decide the same within a reasonable time (not to exceed thirty (30) days). Upon the hearing any person or party may appear in person or by agent or by attorney.

SECTION 1605. Powers

The Board of Zoning Appeals shall have the following powers:

- (a) Administrative Review. To hear and decide appeals where it is alleged by the appellant that there is error in any order, requirement, permit, decision, or refusal made by the building inspector or any other administrative official in carrying out or enforcement of any provision of this resolution.
- (b) Special Exceptions. To hear and decide, in accordance with the provisions of this resolution, requests for special exceptions; for interpretation of the zoning map; and for decisions on other special questions upon which the Board of Zoning Appeals is authorized to pass by this resolution. Special exception permits for any use shall be issued subject to such conditions as the Board may require to preserve and promote the character of the district in which the use is located and otherwise promote the purpose of this resolution.
- (c) Variance. To authorize, upon an appeal, a variance from the strict application of the provisions of this resolution. Where, by reason of exceptional narrowness, shallowness, or shape of a specific piece of property at the time of the enactment of the zoning resolution, or by reason of exceptional topographic conditions, the strict application of any regulation enacted under this ACT would result in peculiar and exceptional practical difficulties to or exceptional or undue hardship upon the owner of such property, to authorize, upon an appeal relating to such property, a variance from the strict application so as to relieve such difficulties or hardships, provided such relief may be granted without substantial detriment to the public good and without substantially impairing the intent and purpose of the zone plan and zoning resolution. In granting a variance the Board may attach thereto such conditions regarding the location, character and other features of the proposed building, structure, or use as it may deem advisable in furtherance of the purpose of this resolution.

ARTICLE XVII. AMENDMENT

The regulations and the number, area, and boundaries of districts established by this resolution may be amended, supplemented, changed, modified, or repealed by the Quarterly Court of Anderson County, but only after a public hearing of which due notice shall be given as provided in Section 4 of Chapter 33, Public Acts of 1935. No amendment shall

become effective unless it is first submitted to and approved by the Oak Ridge Regional Planning Commission, or if disapproved, shall receive the favorable vote of a majority of the entire membership of the County Court.

ARTICLE XVIII. LEGAL STATUS PROVISIONS

SECTION 1801. Interpretation and Purpose

In their interpretation and application the provisions of this resolution shall be considered minimum requirements adopted for the promotion of the public health, safety, morals, convenience, order, prosperity, and general welfare of the community.

SECTION 1802. Conflict With Other Regulations

Where this resolution imposes a greater restriction upon the use of buildings or land, or upon the height of buildings, or requires larger open spaces than are imposed by other resolutions, rules, regulations, or by easements, covenants or agreements, the provisions of this resolution shall govern.

SECTION 1803. Saving Clause

If any section, clause, provision, or portion of this resolution shall be held to be invalid or unconstitutional by any court of competent jurisdiction, such holding shall not affect the validity of any other section, clause, provision, or portion of this resolution.

ARTICLE XIX. EFFECTIVE DATE

This resolution shall take effect and be in force from and after the date of its adoption, the public welfare requiring it.

Adopted: _____ 19__

_____ COUNTY JUDGE

Attest:

_____ COUNTY COURT CLERK

APPENDIX NO. 4

SUBDIVISION REGULATIONS

OAK RIDGE, TENNESSEE, PLANNING REGION

Note: These regulations may be made applicable to an incorporated municipality and for use by a City Planning Commission by the substitution in the appropriate sections of the proper municipal legal form and derivation of powers.

- ARTICLE I - PURPOSE, AUTHORITY, AND JURISDICTION
- ARTICLE II - PROCEDURE FOR PLAT APPROVAL
- ARTICLE III - GENERAL REQUIREMENTS FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS
- ARTICLE IV - PREPARATION OF PRELIMINARY PLAT
- ARTICLE V - PREPARATION OF FINAL PLAT
- ARTICLE VI - DEVELOPMENT PREREQUISITE TO FINAL APPROVAL
- ARTICLE VII - SAVING CLAUSE

ARTICLE I

PURPOSE, AUTHORITY, AND JURISDICTION

These regulations provide the Planning Commission with a uniform procedure, and standards of design and construction by which to equally and fairly appraise all proposed plats for land subdivisions.

These regulations provide the prospective developer of real estate with a guide to the prerequisites of land subdivision preparation, review and approval.

A. Purpose

In order to achieve an orderly and economical development of the Oak Ridge Tennessee Planning Region; to conform new developments to the community plan and to control subdivision development in the public interest by insuring adequate planning by developers which will protect existing and future property values and require a standard of development which can be economically serviced, provide a coordinated street lay out, provide adequate public open spaces for traffic, light, air, recreation and public services, provide the necessary water drainage and sanitary facilities for safety, health, and comfort, the Oak Ridge Planning Commission, at its regular meeting on _____, adopted these subdivision regulations.

B. Authority

These regulations are adopted under the authority of Chapter 35, Public Acts of 1935, as granted to Regional Planning Commissions by Chapter 43, Public Acts of 1935. The Oak Ridge Regional Planning Commission (has fulfilled) the requirements set forth in said Chapter 35 which are prerequisites to the adoption of such subdivision regulations.

C. Jurisdiction

These regulations shall govern all subdivision of land within the Oak Ridge Planning Region as defined by the Tennessee Planning Commission in a resolution dated _____, as amended. Within these regulations, the term "Subdivision" shall mean the subdivision of a tract or parcel of land into two or more lots, sites, or divisions for the purpose, whether immediate or future, of sale or building development, and includes resubdivision and, when appropriate to the context, relates to the process of subdividing or to the land or area subdivided.

ARTICLE II

PROCEDURE FOR PLAT APPROVAL

A. General

Before a subdivider or any owner of land lying within the

area of jurisdiction of the Oak Ridge Regional Planning Commission may proceed with the division of such land into two or more lots, sites, or divisions, for the purpose, either immediate or future, of sale or building development, or the resubdivision for such purposes, he shall submit a plan of such proposed subdivision to the Oak Ridge Regional Planning Commission for approval and shall obtain such approval prior to the filing of his subdivision plat for record. Any such plat of subdivision shall conform to the minimum standards of design for the subdivision of land as set forth in Article III of these regulations and shall be presented in the manner specified in Articles IV and V of these regulations. No plat of a subdivision of land within the Oak Ridge Planning Region shall be filed or recorded by the Register of Anderson County without the approval of the Planning Commission as specified herein.

The procedure for review and approval of a subdivision plat consists of two separate steps. The initial step is the preparation and submission to the Planning Commission of a preliminary sketch plat of the proposed subdivision. The second step is the preparation and submission to the Planning Commission of a final plat together with any required certificates. This final plat becomes the instrument to be recorded in the office of the County Register when duly signed by the Secretary of the Planning Commission.

B. Preliminary Sketch Plat

1. In order to secure review and approval by the Planning Commission, the prospective subdivider shall, prior to the making of any street improvements or installations of utilities, submit to the Planning Commission two copies of a preliminary sketch plan. The sketch plat shall meet the minimum standards of design set forth in Article III and contain all the information required in Article IV.

2. Within 30 days after submission of the preliminary sketch plat the Planning Commission will review it and indicate its approval, disapproval, or approval subject to modifications as a basis for the preparation of the final plat. If a plat is disapproved, reasons for such disapproval will be stated in writing. If approved subject to modifications, the nature of the required modifications will be indicated.

3. The approval of the preliminary plat by the Planning Commission will not constitute acceptance of the final plat and will not be indicated on the preliminary sketch plat.

4. Failure of the Planning Commission to act on the preliminary sketch plat within 30 days will be deemed approval of this plat.

5. One copy of the sketch plat will be retained in the Planning Commission files, the other will be returned to the subdivider, with a communication setting forth:

a. the specific changes, if any, required to be made on the plat plan.

b. the extent of construction or improvements, if any, or the amount of the performance bond, if any, which will be required as a prerequisite to the approval of the final plat plan to be subsequently submitted for record.

6. The approval of the preliminary sketch plat shall lapse unless a final plat based thereon is submitted within one year from the date of such approval.

7. On approval of said preliminary sketch plat the subdivider may proceed with the preparation of the final plat and other documents required in connection therewith and as specified in Article V hereof.

C. Final Plat

1. The subdivider shall submit to the Planning Commission three copies of the final plat, which shall follow the approved lay out of the preliminary plat with such modifications as the Planning Commission and the subdivider shall have agreed upon. The final plat shall include all the information as required in Article V. One copy of the final plat, together with any street profiles or other plans or documents submitted therewith, shall consist of the original drawings or any exact copy thereof reproduced in permanent form on cloth or cloth backed paper. When the plat has been approved by the Planning Commission this copy will be returned to the subdivider,

with the approval of the Planning Commission certified thereon, for filing with the County Register as the official plat of record. A second copy containing the certification of the Planning Commission will be returned to the subdivider for his records and the third will be retained in the records of the Planning Commission.

2. A hearing on any proposed subdivision will be held by the Planning Commission before any action on a final plat is taken. Notice of the time and place of the hearing will be sent to the address indicated on the final plat for this purpose not less than 5 days before the date fixed therefor.

3. The Planning Commission shall approve or disapprove this final plat within 30 days after submission. Failure of the Planning Commission to act on this final plat within these 30 days shall be deemed approval of it. If the plat is disapproved the grounds for disapproval shall be stated upon the records of the Planning Commission.

4. Approval of the final plat by the Planning Commission shall not constitute the acceptance by the county of the dedication of any streets or other public way or ground.

5. The Planning Commission will consider approval of a final plat for record only upon the receipt of:

a. Satisfactory evidence that all streets and public ways on the plat have been graded and improved according to the specifications set forth in these regulations and that the sewerage and water supply utilities have been properly installed; or

b. a performance bond covering the construction of such roads and utilities as specified in Article VI; and

c. a certificate from a registered engineer or surveyor that permanent reference monuments of suitable size and materials have been placed and that a satisfactory survey defines the location of such permanent monuments.

6. If the subdivision lies outside the force and effect of an existing zoning ordinance, or if any deed restriction or restrictive covenants are proposed, there must be furnished a plat showing the proposed use of and the restriction on each lot, and the instruments whereby such use or building restrictions will be imposed. These restrictions are to be recorded on or with the final plat.

ARTICLE III GENERAL REQUIREMENTS AND MINIMUM STANDARDS OF DESIGN

A. Streets

1. Conformity to Master Plan: All streets or roads in a proposed subdivision shall conform both in general alignment and right-of-way widths to the Master Plan of Oak Ridge Planning Region as adopted by the Oak Ridge Regional Planning Commission (if such is adopted in whole or part), and they shall be considered in relation to existing and planned streets in adjoining tracts of land. In general, all of the streets should be planned to conform to the conditions of the site and to the zoning of the area as well as the surroundings.

2. Relation to Adjoining Street Plan System: Provision shall be made for the connection and extension of the principal streets existing in adjoining subdivisions or for the proper projection of existing streets if adjoining property is not subdivided. Half streets along the boundary of land proposed for subdivision will not be permitted.

3. Restriction of Access to Arterial Highways and Major Streets: When a tract fronts on an arterial highway or a major street, the Planning Commission may require such lots to be provided with frontage on a secondary or minor interior street.

4. Street widths: The minimum width of right-of-way for the various types of streets shall be as designated by the Master Plan, or if not shown on such plan shall be:

a. Arterial Highways	250 feet
b. Major Streets	120 feet
c. Secondary Streets	80 feet
d. Minor Residential Streets	50 feet

In cases where topography or other physical conditions make a street of the required minimum width impracticable, the Planning Commission may modify the above requirements.

5. Street Grades: Grades of arterial highways and major streets shall not exceed eight (8) per cent. Grades on other

streets may exceed eight (8) per cent, but not fifteen (15) per cent where, in the opinion of the Planning Commission, the best subdivision of land is thereby secured.

6. Street Intersections: Streets shall intersect at right angles as nearly as practicable.

7. Street Center Line Radii: Minimum center line radii of minor residential streets shall be 100 feet; of all other streets, 300 feet; and all curved streets must be so designed as to make possible desirable land subdivision and safe vehicular travel.

8. Dead End Streets: Minor terminal streets or courts (cul-de-sac) shall not be platted longer than 700 feet, with 500 feet being preferable in length, and shall be provided with a turn around of not less than 100 feet in diameter at the closed end.

9. Roadway and Sidewalk Design: Standards for roadways and sidewalk designs shall be at least equivalent to those being currently utilized by the Oak Ridge Department of Public Works.

10. Private Streets: There shall be no private streets platted on any subdivision. Every subdivided property shall be served from a publicly dedicated street. There shall be no reserve strips controlling access to streets, except where the control of such strips is definitely placed with the community.

11. Street Names: No street names may be used which will duplicate, or be confused with the names of existing streets. Existing street names must be projected wherever possible. Short courts or dead end streets may take the same name as the street on which they abut if the names are suffixed with the word "lane," "place," or "court."

12. Alleys: Alleys may be provided in business or industrial districts, but shall not be provided in residential districts.

13. Surface Drainage: All streets and roads shall be so designed as to provide for the discharge of surface water from the right-of-way or any additional areas affected by such grading and drainage as shall be approved by the Planning Commission.

14. Street Tree Planting: Street trees shall be planted in the park way between the curb and the property line in a manner and of species and design approved by the Planning Commission.

B. Blocks

1. Length: Blocks shall not exceed 1320 feet nor be less than 400 feet in length, except where in the opinion of the Planning Commission, conditions of the site and the plan of the subdivision justify variations therefrom. Where blocks are over 800 feet in length there may be required at or near the middle of the block a public pedestrian cross walk dedicated to a width not less than 10 feet to extend entirely across the block.

C. Lots

1. Lot Arrangement: Lots shall have side lines as nearly at right angles to straight street lines or radial to curve street lines as is practicable.

2. Lot Frontage: All lots shall have a frontage of at least 30 feet and abut upon a public street or upon a public vehicular outlet of not less than 20 feet in width which connects directly to a public street.

3. Minimum Lot Sizes: The size and shape of lots shall be appropriate for the type of development contemplated, provided however that no lot size or width shall be less than those required in the zoning district in which the property is located. For lots which cannot be served by the sewerage system, the minimum size shall be 15000 square feet. Corner lots shall have such extra width as may be necessary for the observance of required building set-backs from the side street.

4. Building Set-Back Lines: The depth of building set-back lines from streets shall not be less than the minimum requirements required in the zoning resolution of the Oak Ridge Planning Region.

D. Public Open Spaces

1. Proposed Public Open Spaces: Provision shall be made for parks, play grounds, school sites, or other public open spaces, designated on plans officially adopted by the Planning Commission. The Planning Commission may, where it is reasonable and equitable, require the dedication or reservation of such open space in whole or part within the applicant's sub-

division; provided in no event shall the total amount of required public areas other than streets exceed 5 per cent of the total acreage in the subdivision or the total dedicated public lands including streets within the subdivision exceed 30 per cent of the total acreage. Where the designated open public space require areas in excess of the above designated amounts, the subdivision owner shall have the right to request reasonable compensation from the administering public agency making request of the area. All such provisions shall be consummated prior to the final recording of the subdivision plat or parts thereof and not later than 60 days following approval of the preliminary plat by the Planning Commission.

2. **Community Assets:** In all subdivisions due regard shall be shown for all natural features such as large trees, water courses, historic spots, and similar community assets which, if preserved, will add attractiveness and value to the property.

E. Suitability of the Land

The Planning Commission shall not approve the subdivision of land if from adequate investigations conducted by all public agencies concerned, it has been determined that in the best interest of the public the site is not suitable for platting and development purposes of the kind proposed.

F. Group Housing Developments

A group housing development including the construction of three or more housing units together with the necessary means of access and which is not subdivided into the customary lots, blocks, and streets may be approved by the Planning Commission, if in its opinion, any departures from the regulations contained herein can be made without violating the intent thereof. Plans for all such developments shall be submitted to and approved by the Planning Commission whether or not a plat is to be recorded and no building permit shall be issued until such approval has been given.

G. Easements

The Planning Commission may require easements, not to exceed 10 feet in width, for poles, wires, conduits, storm and sanitary sewers, gas, water, and heat mains or other utility lines, along the rear lot lines, and along side lot lines if necessary or if in the opinion of the Planning Commission, advisable. Such public easements shall remain free of all structures.

H. Variances

Where a subdivider can show that a provision of these Minimum Standards of Design would cause unnecessary hardships if strictly adhered to and where, because of topographical or other conditions peculiar to the site, in the opinion of the Planning Commission, a departure may be made without destroying the intent of such provisions, the Planning Commission may authorize a variance. Any variance thus authorized is required to be entered in the minutes of the Planning Commission and the reasoning on which the departure was justified set forth.

ARTICLE IV

PREPARATION OF PRELIMINARY PLAT

A. Scale

1. The scale is optional but shall not be smaller than 100 feet to the inch.

B. Information on Preliminary Plat

1. Date of preparation, proper north sign, and graphic scale.

2. The name of the subdivision, the names of subdivisions and owners immediately adjacent, the name and address of the owner or owners, and the name of the designer of the plat who shall be an engineer or surveyor registered for professional practice in the State of Tennessee, and/or approved by the Planning Commission.

3. The location of existing and platted property lines, municipal or county boundary lines, streets, buildings, water courses, railroads, utilities, public utility easements, public spaces, and other existing physical features as well as the

present zoning classification, both on the land to be subdivided and on the adjoining properties.

4. The names, locations, widths, and other dimensions of proposed streets, easements, parks and other open spaces, reservations, lot lines, building lines, and utilities.

5. Plans of proposed utility layouts (sewers, water and electricity) showing connections to the existing or any proposed utility systems. When such connections are not practicable, any proposed individual water supply and/or sewage disposal system must be approved by the Planning Commission.

6. Contour lines at intervals of not more than 5 feet.

7. Profiles of all streets showing natural and finished grades drawn to a scale of not more than 1 inch equals 100 feet horizontal, and 1 inch equals 20 feet vertical, when required by the Planning Commission.

8. The acreage of the land proposed to be subdivided.

ARTICLE V

PREPARATION OF FINAL PLAT

A. Scale and Form

1. The final plat shall be drawn at a scale of 1 inch equals 100 feet on a sheet or sheets not to exceed 2 feet by 3 feet in size. When more than one sheet is required for a plat, a suitable index diagram shall be placed on each sheet showing its relation to the other sheets or a separate index shall be added.

B. Information on Final Plat

1. Date of preparation, true north point, and graphic scale.

2. Title of the plat including the name of the subdivision, containing the full legal description of the property involved, unless contained in the Surveyor Certificate, in which case the description in the title may be abbreviated.

3. The exact layout of the subdivision, showing the lines and names of all streets and roads, lot lines, building lines, lots numbered consecutively beginning with number one, house numbers, reservations, easements, and other open spaces to be dedicated for public use or retained for private use of the inhabitants of the subdivision, with notes stating their purpose and any limitations.

4. Blocks in each plat numbered consecutively, and lots in each block numbered consecutively. Lots or parcels which are not intended for sale and which are reserved for or designated to the use of the public may be shown as out-lets and designated by letters.

5. All survey and mathematical information and data necessary to locate all monuments, and other information necessary to insure closure of the plat. The length of all straight lines, deflection angles, and radii, arcs, and central angles of all curves along the property line of each street. All dimensions along the lines of each lot described by coordinates, with true bearings, and angles of intersection which they make with each other, and also location of all building lines and monuments.

6. The names and locations of adjoining subdivisions and streets, and the names of the owners of adjoining properties.

7. The name and address of the person to whom notice of hearing on the proposed subdivision may be sent.

C. Certificates on Final Plat

The final plat shall also contain the following certificates properly signed or ready for signature and dating:

1. Certificate of title showing the ownership of the land and any out-standing encumbrances.

2. Certificate of dedication of streets and other public land to the governmental agency having jurisdiction.

3. Certificate by the engineer or surveyor who surveyed the plat, containing a full legal description of property surveyed.

4. Certificate of approval by the Oak Ridge Regional Planning Commission.

5. Certificate of recording by the County Register.

ARTICLE VI

DEVELOPMENT PREREQUISITE TO FINAL APPROVAL

A. Required Improvements

Every developer of subdivisions shall be required to grade

and improve streets and alleys, install curbs and sidewalks, monuments, plant street trees, install sewers, storm water inlets, and water mains in accordance with the standards established in Article III of these regulations and the following additional regulations:

1. Water Supply System: Water mains properly connected with the Community water supply system or with an alternate supply approved by the Planning Commission shall be constructed in such a manner as to adequately serve all lots shown on the subdivision plat for both domestic use and fire protection. The sizes of water mains and materials of which they are constructed, the location and types of valves and hydrants, the amount of soil cover over the pipes and other features of the installation shall conform with accepted standards of good practice for municipal water systems.

2. Storm and Sanitary Sewers: Storm sewers shall be provided as required. Where concentrations of water flow are such as to cause undue scouring or gulleying of the land surface, paved gutters or ditches or pipes shall be installed. Sanitary sewers meeting accepted standards of good practice and connected with the sanitary sewage system of the community shall be installed in such a manner as to adequately serve all lots, except that this provision may be waived by the Planning Commission where lots which cannot be economically connected with the sewerage system, contain adequate area and proper soil conditions for the installation of approved septic tanks and disposal fields.

3. Monuments: All monuments shown on the subdivision plan shall be installed. Concrete monuments 4 inches in diameter, or square, 3 feet long, with a flat top, shall be set at all street corners, at all points where the streetlines intersect the exterior boundaries of the subdivision, and at the angle points, and points of curve in each street. The top of the monument shall have an indented cross to properly identify the location. Iron pipe not less than 3/4 inches in diameter and 24 inches long and driven so as not to project more than 4 inches from the ground, shall be set at all other lot corners.

B. Time of Construction

No final subdivision plat shall be approved by the Planning Commission or accepted for record by the County Register until the public improvements listed in the foregoing section of this Article shall be constructed in satisfactory manner, or in lieu of such prior construction, the Planning Commission may approve the acceptance of a bond payable to the County Court of Anderson County in an amount equal to the estimated cost of installation of the required improvements, whereby the County will be enabled to make the improvements and install the utilities without cost to itself in the event of default by the subdivider.

ARTICLE VII SAVING CLAUSE

Should any article, section, sub-section, or provision of these subdivision regulations be declared by a court of competent jurisdiction to be invalid or unconstitutional, such decision shall not effect the validity or constitutionality of the regulations as a whole or any part thereof other than the part so declared to be invalid or unconstitutional.